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THE ARMY STUDY FOR USER CONVERSION TO MICRO PUBLICATIONS (IMPACT--ETC(U)
SEP 79 J G HARDY , H L ROBINSON , E MILEY
UNCLASSIFIED AM-79-1 NL

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JOURNAL OF APPLIED CORPORATE FINANCE

LIQUIDITY AND CAPITAL STRUCTURE

THEORY AND EVIDENCE

JOHN R. GRAHAM and MICHAEL L. LERTWONGSATHIEN

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1. The first step is to identify the problem. In this case, the problem is that the company is not meeting its sales targets.

2. The second step is to analyze the data. This involves looking at the sales figures for each product line and identifying the areas where the company is falling short.

3. The third step is to develop a plan. This involves setting specific goals for each product line and determining the strategies that will be used to achieve those goals.

4. The fourth step is to implement the plan. This involves putting the strategies into action and monitoring the results.

5. The fifth step is to evaluate the results. This involves comparing the actual sales figures to the targets and determining whether the plan was successful.

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1. *Journal of the American Medical Association*, 1997; 278: 1033-1038.

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1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

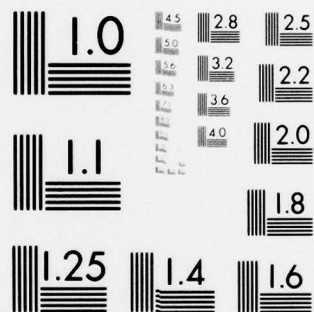
2. Once the problem is identified, the next step is to define the objectives and goals of the project. This helps to clarify what needs to be achieved and provides a clear direction for the work.

3. The third step is to develop a plan or strategy to address the problem. This involves identifying the resources needed, the tasks to be completed, and the timeline for the project.

4. The fourth step is to implement the plan. This involves putting the strategy into action and monitoring progress to ensure that the project is on track.

5. The final step is to evaluate the results of the project. This involves assessing the outcomes against the objectives and goals, and identifying any lessons learned for future projects.





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IMPACT II
THE ARMY STUDY
FOR USER
CONVERSION TO MICROPUBLICATIONS

JOSEPH G. HARDY, STUDY MANAGER

HOPE L. ROBINSON

EDIE MILEY

HAROLD W. JEROME

LEE NORA T. STEWART

E. JOAN HAMILTON

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FINAL REPORT
SEPTEMBER 1979
THE ADJUTANT GENERAL CENTER
WASHINGTON, DC 20314

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER AM-79-1	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) THE ARMY STUDY FOR USER CONVERSION TO MICROPUBLICATIONS (IMPACT II)		5. TYPE OF REPORT & PERIOD COVERED Final: Jul 77-Jul 79
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) J.G. Hardy H.W. Jerome H.L. Robinson L.T. Stewart E. Miley E.J. Hamilton		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS HQ Department of the Army The Adjutant General Center Administrative Management Directorate (DAAG-AM) Washington, DC 20314		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 12 179
11. CONTROLLING OFFICE NAME AND ADDRESS HQ Department of the Army Office of The Adjutant General The Pentagon Washington, DC 20310		12. REPORT DATE September 1979
14. MONITORING AGENCY NAME & ADDRESS (If different from Controlling Office) HQ Department of the Army The Adjutant General Center Plans and Operations Directorate (DAAG-PL) Washington, DC 20314		13. NUMBER OF PAGES
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited. 9 Final rept. Jul 77-Jul 79		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) 20 Joseph G. Hardy, Harold W. Jerome Hope L. Robinson, Lee Nora T. Stewart Edie Miley		
18. SUPPLEMENTARY NOTES A follow on study to: Implementation of Micropublishing Army Concept and Technology (IMPACT). Report Number MP-77-1.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Micropublishing, Micrographics, Microform, Microfilm, Microfiche, Publications, Army Publications, Printing, Information, Information Management, Photocomposition, Electronic Composition, Records Management, Data Base Management, and Word Processing.		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This study addresses the subject of converting users of Army Publications from a paper mode to a microform mode. The primary objective of the study was the design of a detailed, user oriented, implementation plan for the incremental conversion and Army-wide distribution of all applicable Department of Army publications in microfiche, using the most cost effective approach. A recom- mended micropublishing implementation approach is described. During the study several Army publications were created in microform, each had unique elements or characteristics which presented opportunities for publication utility		

Block 20

CONT → improvement. Areas covered were: indexing, formatting, font and point size selection, publications automation, publication data base management, automation, and initial and demand distribution. Additionally, four microform creation processes were tested to take fullest advantage of existing micro-graphic state-of-the-art technology. All investigative work conducted in the course of the study and the results produced are contained in this study report.

← ABSTRACT

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EXECUTIVE SUMMARY

1. INTRODUCTION. The Army's publishing system is immense and complex. Millions of publications - regulations, circulars, field and technical manuals, firing tables, supply catalogs and so on - are channeled through the system each year to soldiers throughout the Army. These publications affect every facet of the soldiers life, and thereby directly affect the Army's readiness, strength, and fighting ability. The Army Study for User Conversion to Micropublishing (IMPACT II) Final Report, here summarized, represents an on-going effort to introduce a new body of technology, micrographics, into the publishing system. It is important to do so because publishing in paper grows ever more costly and cumbersome. The task of preparing, processing, printing, handling, storing, and distributing hardcopy publications is exceedingly and increasingly difficult. Micropublishing, that is, publishing in microfiche, offers a means of overcoming these difficulties. Microfiche are inexpensive, and easy to replace, maintain, store, and use. Because microfiche publications are so portable - an entire library of microfiche repair manuals, for example, can be carried in a container no larger than a shoe box - they are readily adapted to special Army environments and situations. The information gathered during the course of the IMPACT II study shows that large scale micropublishing will not disrupt the publishing system, will, in fact, help to streamline the system and speed Army publications, and the vital information they carry, to their users.

2. BACKGROUND.

a. This study, IMPACT II, is the successor to an earlier study, (Implementation of Micropublishing, the Army Concept and Technology, IMPACT I) of the usefulness of micropublishing to the Army. The immediate objectives of that first study were to examine the system used to publish Department of the Army publications and to design and evaluate a computer output microform micropublishing system for Army use. Both IMPACT studies were prompted by problems, such as severe periodic paper shortages and the steady rise in paper publishing costs, and the consequent necessity to find an alternate, practical means of disseminating information. IMPACT I results show that micropublishing is indeed an appropriate adjunct to the Army's conventional publishing system. The cost of microform publishing is but a fraction of the cost of paper publishing, and, because microform is so portable, and maintenance free, its use promises increased, better service to Army publications users. IMPACT I ended in early 1977 with a recommendation that a detailed follow-on study be initiated to develop a plan to implement micropublishing throughout the Army.

b. The IMPACT II study was begun in July 1977, under the direction of the Adjutant General. IMPACT II was chartered to examine the Army's publishing system - publications preparation, processing, warehousing, requisition, distribution, shipping and mailing, to make a thorough study of the effects of converting to micropublications, in terms both of usefulness and cost, and to develop appropriate methods and means of conversion. Finally, the IMPACT II study team was to put together a proposal, incorporating the findings of both studies, for Army-wide micropublishing implementation.

3. STUDY OBJECTIVES. The chief objective of the IMPACT II study is to design and develop an implementation plan for the conversion of DA publications to microfiche from hardcopy, a plan for Army micropublishing. Chapter 5 of this report outlines the plan developed by the study team to meet this objective. The plan features establishment of a branch within TAGCEN with responsibility for conducting a phased micropublishing program. Under the program, DA publications will be micropublished in increments which generally will consist of special categories of publications, such as the Tables of Organization and Equipment, Catalog Lists, and regulations. The other study objectives, met while the implementation plan was under development, were to:

a. Identify, detail, and evaluate the major alternative incremental approaches to implement micropublishing, by function, by hierarchy, by geographic location.

b. Establish evaluation criteria for the selection of the best approach, based on proponent/user constraints.

c. Select the implementation approach and develop a schedule for conversion.

d. Gain necessary approvals and establish budgetary processes required to execute implementation as planned, to include fixing the extent of proponent responsibility for absorption of conversion costs.

4. STUDY APPROACH. The IMPACT II Study was conducted in the following three phases, arranged to lead to development and design of the Army micropublishing implementation plan.

a. Phase I - Project Task Assignments. During this first phase, project tasks were assigned to task groups formed in participating TAGCEN directorates and the tasks themselves scheduled for completion during Phase II.

b. Phase II - Data Collection.

(1) In this phase all areas of concern affecting development of the implementation plan were investigated. These included availability of microfiche viewer and viewer-printer equipment, characteristics of both individual and categories of DA publications (their sizes, numbers, makeup, graphic and color content, distribution, and so on), affects, including cost of large-scale micropublishing on the Army's publishing system, and, in particular, on its distribution system, publications preparation processes, microfiche preparation and design, and, most important, usability of microfiche publications under all of the conditions prevailing in the Army. Information was collected during completion of the 30 tasks assigned during Phase I and was then organized for analysis in Phase III. The tasks themselves fell into five general categories:

- (a) Micropublishing user equipment.
- (b) Publications use.
- (c) Publications regulatory requirements.
- (d) Publications distribution.
- (e) Publications conversion.

Specific tasks and findings are described in Chapter 2 of this report.

(2) During Phase II, the IMPACT II Study team undertook several additional, related projects in response to requests for assistance from various publications proponents interested or involved in micropublishing. Other similar projects were undertaken in an effort to solve microfiche production problems which arose during this data collection phase. This project work focused on format and indexing design considerations, pre-production testing of various procedures and microfiche formats and designs, and selection and testing of user equipment. As a result of one of these projects, a flexible indexing technique was developed for regulations, field and technical manuals, and technical bulletins. The technique is particularly important to the micropublishing effort, because it can be tailored to other types of publications, and so makes their conversion to microfiche practical and attractive. In fact, publications converted to microfiche and so indexed are often easier to read and therefore more useful in microfiche than in paper. This and other projects supporting the study are described in Chapter 3 of this report. An expanded analysis of publishing system costs was also prepared during this phase. It shows that micropublishing brings greatest savings during distribution cycles, that is, the difference in the costs of

distributing microfiche and hard copy are more significant than any other. For this reason, larger publications, frequently reprinted in high volume, are prime candidates for micropublishing.

c. Phase III - Data Analysis. During Phase III, collected data was evaluated and analyzed as a basis for developing the plan for implementing micropublishing. Chiefly, the analysis shows that certain types of publications - those with no color and few graphics, changed or revised frequently, and used mainly for reference in offices or other protected environments - lend themselves spectacularly to micropublishing. The exhaustive survey of DA publications conducted during Phase II of the Study, identified several such categories, as well as individual publications. For these reasons, the proposed implementation plan calls for micropublishing such publications as TOE, CTA, CL, etc., in stages, early in the micropublishing program. The flexible indexing and formatting technique, mentioned above, will allow rapid conversion of these publications. Analysis also shows that the Army publishing system itself requires little change for either small or large scale conversion. (One such small change was acquisition of ink jet labelers to speed and ease Publication Center distribution of high volume microfiche publications.) But the chief finding was that present publication preparation methods are costly, whether final product is to be hardcopy or microfiche. The proposed implementation plan therefore calls for automating preparation processes in their early stages. Chapter 4 of this report discusses several means of doing so.

5. ELECTRONIC PUBLICATIONS PREPARATION. Information collected during the course of this Study shows that the processes used throughout the Army to prepare Army publications for printing are labor intensive and expensive. For example, manuscripts forwarded to TAGCEN for eventual printer typeset are often typewritten several times during preparation. The greater percentage of DA publications are edited, marked up, and composed manually, which processes are likewise time consuming and wasteful. The IMPACT I Study group developed, tested, and proposed an automated in-house, COM-based micropublishing system. That system contained a centralized publications preparation subsystem for data capture, markup and composition. But, because the primary thrust of IMPACT I was the development of the in-house micropublishing system itself, the proposed subsystem was not sufficient to automate preparation of the greater part of DA publications: those publications prepared elsewhere by their proponents. To correct this deficiency, the IMPACT II Study Report recommends that publications preparation be automated in its early stages, and proposes three alternate approaches for such automation. The first of these is an in-house system

employing 10 independent text editing systems, and, one photocomposer and illustration scanner. This system could handle in excess of 425,000 pages of administrative or like publications annually at about \$12.80 a page (present cost per page is approximately \$20.00). The system could output camera-ready paper, original microfiche, or any combination of the two. It is, therefore, a complete electronic publications preparation system. The second system employs contract services for essential publications preparation processes. It includes publication design, data base input with graphics digitization, page makeup and production of camera ready copy or microfiche. Per page cost is approximately \$13.68. The last system proposed is a combination of the first two. It offers greater flexibility and savings, since it can be tailored to fit the Army's myriad publications situations. That is, appropriate equipment and services can be acquired competitively to fit specific changing proponent/Army headquarters preparation needs. Cost of this system will, of course, vary in proportion to its composition. Whichever of these systems is adopted will have great effect on the entire Army publishing system: both efficiency and products will be much improved.

6. MICROPUBLISHING IMPLEMENTATION PLAN. The plan for Army-wide conversion to micropublishing, proposed in Chapter 5 of this report, is sufficiently flexible to fit the Army's publishing system. It must be so to accommodate the Army's more than 50,000 publications of widely differing types, prepared by some 200 proponents, under differing circumstances. The plan, for example, must provide for micropublication of documents as different in both makeup and use as technical manuals, firing tables, and regulations. To allow for such difference, the plan calls for establishing a micropublications development branch within TAGCEN to continue work begun during the IMPACT II Study: selection and evaluation of publications to be micropublished, and microfiche publication development and testing. The branch is to have full responsibility for developing Army micropublished products, and the initial issue in microform. The plan provides that appropriate DA publications will be micropublished in increments. Publications best suited for micropublication from a technical point of view - those printed in volume and changed frequently, with few graphics and no color - will be in the first group to be considered. Publications used, for the most part, in offices or under cover, such as many technical manuals used by maintenance crews where viewers are readily available, will also be among the first candidates. The plan schedules DA Pamphlets 310-1, -2, -3, -4, -5, and -99, publications indexes, for early micropublishing, since these meet all the above requirements. Next on the schedule, and already under development, are the Tables of Organization and Equipment, Common Tables of Allowances, and Component Lists. Army Regulations 340-18 and -21

would also be among the first publications to be published and distributed in microfiche. Proponents will be encouraged by the Micropublishing Implementation/Development Branch to propose other suitable publications for micropublishing.

7. CONCLUSIONS.

a. The Army now has over 50,000 microfiche viewers in use, these are used in office or covered environments. 55,000 new microfiche viewers will be required when DA Pamphlets 310-1, -2, -3 and -4 and -5 are micropublished. These should be dual lens, 18x and 36x, 3/4 size viewers as described in MIL-V-80240B as a Type II, NSN 6730-01-080-1188, Line Item Number (LIN) Y03820.

b. Viewers to support the micropublishing program should be acquired through the Defense Supply Agency, Richmond, VA. This approach allows access to the MILSTRIP requisition process, helps maintain projected costs and provides individual unit acquisition of any quantity.

c. The only central funding apparently available to support initial viewer requirements (55,000) is through the Army Productivity Improvement Program. Category three of this program covers projects over \$900,000 and requires pay back within five years. The seven million dollar potential viewer investment can easily be paid back by printing and distribution savings derived from micropublishing.

d. The use of microfiche in the Army is wide-spread and a variety of micropublications are now in use. Micropublishing of administrative and supply publications would not impair the readiness posture of the Army.

e. Quality micropublishing cannot be produced unless publications fonts and point sizes now in use are changed/modified. Paper publications cannot be successfully converted directly (source document filming); they must be properly prepared for production in microform. Publications automation affords the opportunity to compose material in suitable form, for either paper or microform production.

f. Split-mode (paper and microfiche) publication situations are possible where cost effectiveness can be maintained if split-mode is carefully controlled. However, there is a cross over point at which split-mode for any publication would result in greater cost than paper only. Therefore, split-mode publication should be avoided.

g. Because makeup, use and other aspects of each publication or group of publications is unique, publications development is

necessary prior to micropublishing. Micropublishing will not just happen in the Army, it must be actively promoted and preliminary development work done if resistance to change is to be overcome.

h. Advance notice should be given of intent to micropublish particular publications; this notice should also provide instructions for requisitioning viewers. Point of contact should be provided to handle special situations and requirements.

i. Posting and updating of current publications as a result of change publications becomes a task of the past, if publications are automated. Cost effectiveness of micropublishing allows complete replacement of publication at a fraction of the cost associated with a paper publication change.

j. Occasionally, paper prints from a microfiche are needed. Need will increase as micropublishing increases, but, should not be allowed to cause an uncontrolled proliferation of viewer-printers or high-speed-microfiche-to-paper copying machines.

k. The two Army publications distribution centers can make microfiche distribution without difficulty, provided microfiche publications are pre-packaged in envelopes. An ink jet labeling device has been tested and found suitable for addressing various quantities of microfiche in pre-packed mailing envelopes.

l. Publication distribution in microfiche is the single greatest area of savings documented. Using current distribution cost factors and rates microfiche is at least 55% less expensive for initial distribution and 90% less expensive during resupply when compared to distribution of publications in paper.

m. Microfiche duplication (printing) at the distribution centers is not an acceptable alternative to contract duplication. JCP approval is required for such large scale duplication and would be hard to justify since quality duplicate microfiche are readily available at competitive prices from commercial sources. However, duplication for resupply (demand printing) may be justified when sufficient numbers of publications have been established as micropublications.

n. There are three criteria needed to implement a publication in microfiche:

- (1) Usability of information in microform.
- (2) Viewer availability.

(3) Viewing equipment costs offset by micropublishing savings.

o. Several alternative approaches to producing publications in microfiche are available. All use automated processes to effect increased productivity through reduction of manual workload processes. Development of individual or groups of publications as separate micropublishing applications will produce the most cost effective result. Original microfiche production approaches vary insofar as cost is concerned by as much as 400:1.

p. An in-house micropublishing system is cost justified on the basis of economics; however, it assumes a throughput per annum of over 425,000 pages. Contract services micropublishing is estimated at \$1.00 more per original copy page created than in-house micropublishing; however, it does not carry a requirement to produce a fixed number of pages per year.

8. RECOMMENDATIONS.

a. That a group be established (initially as a branch) and given the responsibility of carrying out publication development, including automation, test and acceptance, initial implementation, validation and operational release functions described in the micropublishing implementation plan.

b. That contract services be used for automated publications preparation and micropublishing until such time as the necessary automated micropublishing base has been established.

c. That automated publications preparation be undertaken using the Information Standard Format (ISF) approach as a means of developing the publications data base.

d. That the necessary microfiche viewers be acquired through the Defense Supply Agency, regardless of funding approach.

e. That an effort be undertaken to secure funds for microfiche viewers under the provisions of the Army Productivity Improvement Program.

f. That acquisition of microfiche viewer-printers (MACOM controlled) and microfiche-to-paper-copiers (DAAG controlled) be limited to essential requirements.

g. That all micropublications duplication meet the duplication specification contained in this report and be acquired through contract services until such time as a sufficient micropublications base can justify resupply (demand

distribution) duplication at the distribution centers.

h. That distribution of all Army micropublications be performed by the distribution centers.

CHAPTER 1

INTRODUCTION

1-1 GENERAL.

a. Information and the communication of that information through the printed word has become one of the most important challenges the Department of Army has had to come to grips with during the 70's. Increasing demands are being placed on the professional soldier because of advanced technology in the form of sophisticated weapon systems and administrative policy and procedure designed to make today's Army the most responsive. Today's Army is driven by paper. A typical weapon system may require ten linear feet of documentation to support it. The information must be current as must all the publications listed in over 1,000 pages of publication index that describe the more than 50,000 Army publications.

b. The need for more information is ever increasing. The cost requires a fiscally responsible Army to seek an acceptable and more cost effective alternative approach to the dissemination and use of information. Micropublishing in the Army while not new, has for the most part, until now been limited to supply catalogs and related publications. IMPACT I, Implementation of Micropublishing Army Concept and Technology, proved that publications other than supply catalogs could be produced in microfiche and successfully used to replace paper as the information medium. The Department of Army, based on the results of the first IMPACT study, determined that the Army could benefit from micropublishing. However, prior to proceeding, it must have a detailed proposal for implementation.

c. This final report provides a detailed, user oriented, incremental plan for conversion and Army-wide distribution of all applicable Department of Army publications in microfiche. Personnel responsible for the preparation of Army publications will find this study report a useful aid to understanding processes for micropublications preparation, specifically those processes whose products best meet user requirements in this information communications medium.

1-2 PROBLEM.

a. The necessary information to design and implement a plan for the conversion of Department of Army publications to microfiche from hardcopy is not presently available. This includes cost data on those micropublishing system elements which were not established by Project IMPACT I Cost/Benefit Analysis (CBA) and the incremental procedures for implementing an

Army-wide conversion effort. A study seeking to develop a plan for an optimal transition from hardcopy publications to the microfiche media must address the basic issues -- what is needed, and how best to provide it in the most cost effective manner. The basic concerns on which this study focused were:

(1) The effect that micropublishing major portions of the Army publications will have on:

- (a) The Army's readiness posture.
- (b) Publications users.
- (c) Publications proponents.
- (d) Army major commands.

(2) Alternative approaches to micropublishing conversion/implementation; limiting factors of each approach.

(3) Changes in Publications Directorate production procedures necessary for micropublishing implementation.

(4) Publications in Dual/Split Mode.

(5) Expanded CBA covering the entire publication system: including proponent input, production, storage, distribution, and replenishment phases.

(6) Details of the development of a user implementation plan, including direction, phasing and scheduling of a phased-in conversion to micropublishing of selected Department of the Army publications.

1-3 BACKGROUND

a. The increasing costs of Department of Army publishing, relative to the effect of the inflationary spiral upon labor and material costs, continues to be a prime target for cost savings. Appropriately applied micrographics technology can bring significant economic advantages over the customary hardcopy process. Economic gains and improved service to the user as evidenced in federal, state and private sectors may be achieved by the Department of Army through conversion of applicable documents to microfiche.

b. IMPACT I began in February 1975 under the sponsorship of the Adjutant General. It was specifically charged by directive to design and evaluate a state-of-the-art Computer Output Microform (COM) micropublishing system which could meet

Headquarters, Department of Army, publishing requirements. IMPACT I achieved its objective through extensive reconnaissance, Army-wide surveys, a brigade-level user test and the six-month in-house operational test of a sophisticated prototype COM micropublishing system. Findings were presented in a final report which included presentation of a proposal for a full-scale micropublishing implementation. The report also included a CBA of the prototype system used operationally for six months, and an extrapolation of the developed model which duplicated the proposed system analysis.

c. Following a briefing on 9 March 1977, The Adjutant General determined that a detailed plan for conversion of the Department of Army publications from hardcopy to microfiche should be developed prior to proceeding with the installation of a micropublishing production facility as was recommended in the first IMPACT study report. This second study would thoroughly investigate, evaluate and analyze all areas pertinent to the design of the optimal conversion plan. Specifically, the new study was to address proponent and user concerns: storage, viewing devices, distribution and replenishment systems; as well as the problems inherent in the transition to using micropublications throughout the Army.

1-4 STUDY OBJECTIVES.

a. Several factors affect development of a user implementation plan. The availability of viewer and viewer-printer equipment is of prime importance. No accurate or complete information exists to pinpoint the quantity, location, or usage requirement of viewer equipment throughout the Army. The conversion of the full scope of Department of Army documents will depend upon usability in the diverse environments of the Army. Surveys to determine these requirements are necessary. Since microfiche require different storage, distribution, and replacement systems (than hardcopy publications), conversion can materially affect the present publishing system. An analysis of the changes/effects upon the personnel, equipment, space and other resources is also necessary. The complexity of conversion requires coordinated analysis in order to produce a total micropublication program that best meets Army requirements.

b. The overall objective of the study is to produce a user implementation plan which will make optimal use of micropublishing technology throughout the Army. Secondary objectives are to:

(1) Identify, detail, and evaluate the major alternative incremental approaches to implement micropublishing: by function, by hierarchy, by geographic location.

(2) Establish evaluation criteria for the selection of the optimal approach based on proponent/user constraints.

(3) Select the implementation approach and develop a schedule for conversion.

(4) Gain necessary approvals and establish budgetary processes required to execute implementation as planned, to include the extent of proponent responsibility for conversion costs.

1-5 STUDY APPROACH.

a. The study was structured into three phases to insure timely completion of specific functions/tasks by the participating directorates. The three phases were: Project Task assignment, Data Collection and Data Analysis.

b. Phase I - Project tasks were assigned to appropriate directorates before the study formally began. At this time directorate task groups were formed and task elements scheduled.

(1) The Administrative Management Directorate was assigned project supervision and control, as well as day-to-day conduct of the study. A four member Directorate team was appointed to carry out appropriate tasks and to prepare a final report.

(2) The Plans and Operations Directorate was directed to monitor progress, provide guidance and product review. The Directorate was to provide a four member team to the Administrative Management Directorate for administrative, technical, and analytical support during the life of the project.

(3) The Publications Directorate was directed to supply information/assistance necessary to achieve study objectives, in addition to completing appropriate project tasks.

c. Phase II - Data Collection. In this phase all areas of basic concern were to be investigated. Data collected through letter/phone contacts, surveys, and personal interviews is filtered, organized and formally presented for Phase III analysis. The specific tasks of Phase II are addressed in Chapter 2 of this report.

d. Phase III - Data Analysis. All inputs from Phase II data collection were evaluated and analyzed to develop and select an optimal implementation plan for the conversion of selected publications to microfiche. Prepare and submit a final report to include an expanded CBA (Based on IMPACT I model), a proposed user implementation plan and a proposed publication schedule.

CHAPTER 2

DATA COLLECTION AND FINDINGS

2-1 GENERAL.

a. The first IMPACT study devoted much of its effort to the design and evaluation of an in-house state-of-the-art computer output microform (COM) micropublishing system. A brigade-level user test of publications in microfiche was linked to the COM micropublishing system test. IMPACT I study results show that Army publications other than those closely related to supply functions can in fact be converted to microfiche and used successfully in place of paper publications. The implementation plan proposed by IMPACT I; however, described only that portion of a micropublishing system that would replace the paper publication production functions; it did not address other publishing functions, such as preparation, distribution or resupply.

b. For reasons stated above, the Army's publications and micrographics management staff recommended a follow-on study (IMPACT II) to investigate preparation, distribution and resupply functions prior to formal implementation of an Army micropublishing program. IMPACT II addresses proponent and user concerns, storage, viewing devices, distribution and replenishment systems, and the problems inherent in an incremental transition to use of Department of Army publications in microform. Chapter 2, Data Collection and Findings, covers those questions raised by the Army's publications and micrographics management staff. For the purpose of this study, the questions became tasks whose answers/results became the foundation for the Army's micropublishing implementation plan.

c. The tasks have been grouped in five categories - the major topic areas addressed in this study are:

- (1) Micropublications user equipment.
- (2) Publications use.
- (3) Publications regulatory requirements.
- (4) Publications distribution.
- (5) Publications conversion.

d. A general statement describing the tasks and approaches used to arrive at solutions, is followed by, for each task, a task statement and related information/discussion in this format:

- (1) Task statement as it appears in the project directive.
- (2) Modification, if any.
- (3) Investigative approach taken.
- (4) Findings.

2-2 MICROPUBLICATIONS USER EQUIPMENT.

a. Five tasks are grouped in this category. Two of these pertain to equipment (microfiche viewers), already available for use when large scale micropublishing begins. A third task deals with procedures for acquiring additional equipment; another requires the definition of minimum requirements for acceptable viewing devices. The last question concerns equipment yet needed by users of different types of micropublications, as well as the estimated cost of that equipment. An Army-wide survey was conducted to answer questions dealing with equipment on hand as well as future requirements. Additional information was taken from Army micrographics program files. The procurement question was answered by information gleaned from interviews and research.

b. TASK -- Establish the current Army inventory of microfiche viewers and viewer-printers to include: quantity, type, age and usage.

(1) The Department of Army has been acquiring microfiche viewing devices for over ten years. The Common Table of Allowance CTA 50-913 (Office Type Furniture and Equipment) lists microfiche viewing equipment and sets allowance levels. AR 340-22 (The Army Micrographics Program) prescribes policy relating to acquisition of micrographics equipment. AR 340-22 authorizes acquisition of dual lens microfiche viewing devices for Army personnel receiving information (whether from inside or outside Army) in microfiche form (i.e., forced users). The regulation requires that a DA Form 1500-R be submitted to the Micrographics Management Division when viewing equipment is acquired under forced user authority. All acquisitions are to be so reported, even though acquisition may be approved at various organizational levels. This fact should make an accurate inventory of equipment rather simple. However, the Micrographics Program was not established until November 1973, and records before that time are sketchy: micrographic equipment information is available in relation to systems, but not by equipment type. There is no automated data base for reference. Furthermore, some equipment acquired since 1973 may not have been reported.

(2) A survey was, for above reasons, necessary. All project tasks were reviewed, in order that the survey be as complete and

useful as possible, that is, that sufficient information be solicited from publications users. It was decided, after discussion with Publications Directorate, to survey via the publications distribution system. The survey questionnaires would thus reach appropriate personnel - publications and microfiche users - and distribution system controls could be used to audit and monitor response, preliminary to analysis. Two simple questions were agreed upon that would provide the current and near term inventory information. The two questions asked were:

- (a) Number of microfiche viewers now available for use.
- (b) Number of microfiche viewers due in.

(3) These two questions coupled with another four designed to answer subsequent tasks made up the Army-wide survey of microfiche viewer equipment (Figure 2-1, Page 8). Methods other than a survey were resorted to for information regarding viewer type, age, usage and viewer-printer quantity, type, age and usage. The following information was gleaned from available Micrographics Program Management records.

(a) Less than 1,000 microfiche viewers were in use prior to 1973. Most viewers and viewer-printers were low magnification (10X-30X) roll film and aperture card type.

(b) The Federal Supply Catalog System (MINICATS) and the Army Master Data File in microfiche were implemented between 1973 and 1975. There are 17,000 users of these catalogs in Army. All viewers and viewer-printers have capability to display 48:1 microfiche at 100% blowback. Viewers procured for these programs between early 1973 and late 1974 have, for the most part, been replaced with dual-lens viewers because the original viewers were determined to be less than adequate. See Appendix A for information bulletin. The ratio of viewers to viewer-printers is estimated at 10:1.

(c) Since 1974, it has been the Micrographics Program Management policy to approve one viewer-printer per ten viewers. The ratio is actually much larger.

(d) More than 10,000 viewers (all dual lens) and 500 viewer-printers (interchangeable or dual-lens) were acquired in 1976, in connection with two new micrographic systems (supply publication and personnel record system).

(e) In 1977-78 over 15,000 viewers (interchangeable and dual-lens) and 500 viewer-printers (interchangeable or dual-lens) were acquired, primarily for management reporting systems.

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ARMY MICROFICHE VIEWER EQUIPMENT SURVEY

RCS AG-(OT) 782

MORE MICROFICHE ARE COMING! THE PURPOSE OF THIS SURVEY IS TO DETERMINE YOUR NEEDS AS MORE PAPER PUBLICATIONS ARE REPLACED WITH MICROFICHE. TO HELP YOU GET READY FOR THE CHANGES, THE FOLLOWING INFORMATION IS REQUESTED. IN ANSWERING THE QUESTIONS CONSIDER ALL THE PEOPLE WHO CAN USE YOUR PUBLICATIONS ACCOUNT NUMBER.

YOU MAY RECEIVE THIS SURVEY FROM BOTH BALTIMORE & ST. LOUIS. ANSWER ONLY ONE OF THESE SURVEYS. HOWEVER, STAPLE ALL COPIES OF THE SURVEY TOGETHER AND RETURN THEM AS ONE PACKAGE.

WRITE IN THE QUANTITIES FOR THE FOLLOWING:

- A. Number of microfiche viewers now available for use (1) (3)
- B. Number of microfiche viewers due in (4) (6)
- C. Expected need for additional viewers if all publications were on microfiche (7) (9)
- D. Expected need for additional viewers if only publications indexed in DA PAM 310-1 are converted. (10) (12)
- E. Expected need for additional viewers if only publications indexed in DA PAM 310-3 are converted. (13) (15)
- F. Expected need for additional viewers if only publications indexed in DA PAM 310-4 are converted. (16) (18)

NOTE: Converted publications will be distributed on microfiche in either 24:1 or 48:1. Viewer, Microfiche, NSN 6730-00-116-1618 (dual lens 24X/48X and dual voltage 115/230±5), line number Y03820, in CTA 50-913 will meet microfiche viewing requirements.

NOTE: Personnel are available to answer questions concerning the survey. Call AUTOVON 223-0315.

FOLD AND STAPLE THE SURVEY CARD SO THAT THE RETURN ADDRESS SHOWS, AND SEND IT BACK WITHIN FIVE DAYS AFTER YOU RECEIVE IT.

Staple Here

FIGURE 2-1

NO

YES

ANSWERING THIS SURVEY WILL MAKE SURE THAT YOU WILL RECEIVE ALL
THE PUBLICATIONS AND VIEWING EQUIPMENT YOU WILL NEED IN THE FUTURE.
HAVE YOU CONSIDERED ALL THE PEOPLE WHO CAN USE YOUR PUBLICATIONS
ACCOUNT NUMBER?

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FIGURE 2-2

(f) Similarly, micrographic systems approved by the Micrographics Program between 1973 and present, not constituting any of the major systems just mentioned, account for an estimated 2,000 viewer-printers.

(4) From this recorded information and from survey results (82% response), an inventory of microfiche viewers and viewer-printers in use in the Army was compiled.

(a) The inventory shows that less than 5,000 microfiche viewer-printers are in use; most are less than three years old; few older than five years; most have at least interchangeable lens capability, and many, less than two years old, have dual-lens. These viewer-printers are used primarily to support logistics, personnel, management and administrative information functions.

(b) At least 54,000 microfiche viewers are now in use Army-wide. 45,000 are less than five years old and 30,000 of these are less than three years old. Less than 10,000 in use are fixed lens for 48:1 microfiche use; the remainder have interchangeable lens capability or have dual lens. The 48X fixed lens viewers are used primarily for logistics support. All other microfiche viewers are used primarily to support logistics, personnel, management and administrative information systems.

c. TASK -- Determine distribution pattern of equipment now in use as to specific location.

(1) Upon determining that the publications distribution system was the appropriate vehicle on which to float an Army-wide survey of microfiche viewers the task became simple.

(a) Surveys were printed and shipped to the publications distribution centers.

(b) Centers attached mailing label to survey card (Figure 2-2, Page 9,) and dispatched.

(c) Label contained publication user address and account number.

(d) Distribution centers provided study group magnetic tape copy of mailing list.

(e) Survey response data was keyed along with account number from address label. (Address label had been made a part of survey response.)

(f) Keyed data was merged with address label file.

(g) File was sorted by zip code and printed.

(2) Over 22,000 surveys were distributed to more than 15,000 publications account number holders. The response was 82%. The most meaningful information derived in response to this task is:

(a) Microfiche viewers are used at all levels and in all elements of the Army.

(b) Microfiche viewers are available at almost all Army locations.

(c) An accurate count of viewers by organization could be developed based on survey response.

(d) A list of non-respondents by zip code or organization could be provided should a 100% response to the survey become of some value.

d. TASK -- Identify and cite current procurement policies in regard to viewers and viewer-printers, and include funding sources.

(1) There are several means of procuring microfiche viewers and viewer-printers. However, preliminary to procurement, one should first make some decisions regarding the item itself. The next task addresses requirements.

(2) A single central procurement to meet all Army requirements offers the greatest opportunity of acquisition at the lowest cost. Central procurement of viewers to support the base operations-COMPACS (BASOPS-COMPACS) implementation resulted in a 40% savings over individual procurement of same equipment. This savings does not include or take into consideration procurement cost that could have been incurred if single procurement actions had taken place at each BASOPS installation. The following information was taken from the Armed Services Procurement Regulation (ASPR) and is provided as basic guidance associated with procurement of items covered by specifications.

1 July 1976

GENERAL PROVISIONS

Part 12-Specifications, Plans, and Drawings

1-1201 General.

(a) Plans, drawings, specifications or purchase descriptions for procurements shall state only the actual minimum needs of the Government and describe the supplies and services in a manner which will encourage maximum competition and eliminate, insofar as possible, any restrictive features which might limit acceptable

offers to one supplier's product, or the products of a relatively few suppliers. Items to be procured shall be described by reference to the applicable specifications or by a description containing the necessary requirements. Referenced specifications and standards shall be tailored in their application. Tailoring consists of the exclusion of those sections, paragraphs or sentences of individual specifications and standards not required for a specific procurement so that each document applied states only the minimum requirements of the Government. Such tailoring need not be made a part of the basic specification or standard but will vary with each application dependent upon the nature of the procurement. When specifications are cited, they, and all amendments or revisions thereof applicable to the procurement, shall be identified, including the respective approval dates of the applicable issue, revision, amendment, or notices. When specifications, standards, or other documents are referenced in cited specifications, their effective issue or revision shall be that listed in the Department of Defense Index of Specifications and Standards (DoDISS) and supplements thereto, unless (i) specific issues are set forth therefor in the cited Specifications or (ii) different issues than those specified in the cited specifications are set forth in the solicitation. The date of the applicable DoDISS and supplements thereto shall be set forth in the solicitation. Copies of all specifications, standards, and other documents citing issue dates other than those shown for the documents by the specified DoDISS must be furnished with the solicitations as prescribed by 1-1203. The requirement to identify the DoDISS, specifications, standards, and other documents by issue refers to the specific calendar date of approval printed on the document or the latest applicable amendment or revision notice. General identification such as "the issue in effect on the date of the solicitation," or similar language, shall not be used. Drawings and data furnished with solicitation shall be clear and legible.

(b) Many specifications cover several grades or types, and provide for several options in methods of inspection, etc. When such specifications are used, the solicitation shall state specifically the grade, type, or method of inspection, etc., on which bids or offers are to be based.

1-1202 Mandatory Specifications.

(a) Except as provided in (b) below, the following specifications are mandatory for use by the Department of Defense in the procurement of supplies and services covered by such specifications:

(i) Federal specifications, unless determined by the Department of Defense to be inapplicable for its use;

(ii) Military specifications approved by the Department of Defense for its use; and

(iii) Industry documents adopted by the Department of Defense as listed in the Department of Defense Index of Specifications and Standards.

(b) Federal and Military specifications need not be used for the following unless required by Departmental instructions:

(i) purchase of items for authorized resale except military clothing;

(ii) purchases for construction when nationally-recognized industry and technical source specifications and standards are available (see 18-107); or

(iii) purchase of items in an amount not to exceed \$10,000 (multiple small purchases of less than \$10,000 of the same item shall not be made for the purpose of avoiding the use of Federal or Military specifications).

AUTHORS NOTE:

Purchases described in ASPR 1-1202(b) while not required to use Federal and Military specifications in these procurements may be used at the option of the contracting officer. See Army Procurement Procedure Part 12, paragraph 1-1202.

(c) Unless required by Departmental instructions, Federal and Military specifications need not be prepared for use in the below listed procurement actions; however, existing Federal and Military specifications, and adopted industry documents to the extent that they are applicable to the item or service required, shall be used for:

(i) purchase incident to research and development;

(ii) purchase of items for test or evaluation;

(iii) purchase of laboratory test equipment for use by Government laboratories;

(iv) purchase of one-time procurement items; or

(v) purchase of items -

(A) for which it is impracticable or uneconomical to prepare a specification (Repetitive use of a purchase description containing the essential characteristics of a specification will be construed as evidence of improper use of this exception.) or

(B) when the purchase involves an item which is the product of private development and the provisions of 1-304 are complied with.

(d) If it is determined, in accordance with the procedures established under the Defense Standardization Program by the Assistant Secretary of Defense (Installations and Logistics), that the specifications listed in (a) above do not meet the particular or essential needs of a bureau, service, or command, then (except as provided in (b) and (c) above) applicable amendments, revisions, or new specifications (interim Federal or limited coordination Military) shall be immediately prepared and used.

(e) When it is necessary to make interim changes or corrections to specifications or standards to effect a procurement, the authorizing activity shall take immediate action to advise the specification or standard preparing activity of the changes or corrections."

--END ASPR CITATION--

(3) Procurement policy can best be described by example: If the decision is made to centrally procure viewers through The Adjutant General Center (TAGCEN) a Disposition Form (DF), DA Form 2496, with specifications, requirements, volume (number of units of each item to be purchased), and approximate total cost for each item would be prepared by a TAGCEN element and forwarded to the Personnel and Administration Directorate, Administrative Support Division (DAAG-SPS). Requestor must state in the specifications and/or requirements if deliveries are to be staggered, dates of delivery, where in the Continental United States (CONUS) the deliveries are to be made, and the quantity of each delivery. The lead time is as long as it takes to prepare the paperwork. DAAG-SPS prepares DD Form 1262, Administrative Service Report, and forwards the paperwork to the Defense Supply Service-Washington (DSSW). The lead time is one week. DSSW has several alternatives for procuring the viewers:

- o Contact the Richmond depot.
- o Purchase the requested item.
- o Competitive bidding.
- o Consult the Federal Supply Schedule.

- o Forward responsibility to the General Services Administration (GSA).

(a) DSSW then prepares DA Form 2765, Military Standard Requisitioning and Issue Procedures (MILSTRIP), and contacts the Richmond depot when an item, regardless of the total cost, has a Federal Stock Number (FSN). The on-hand quantity is distributed by the depot. Requestor is responsible for providing DSSW with duplicate mailing address labels developed from DOD Address Directory (DoDAD) and the quantity to be shipped to each organization. If either the item is not stocked or the on-hand supply is insufficient to meet the demand, a backorder occurs. A backorder lead time is at least 90 days. The lead time for the depot to receive the request from DSSW is two weeks. Another two weeks are required before the depot begins distribution. An organization in CONUS can expect delivery within 30 days, 110 days elsewhere. The total lead times from requestor forwarding the paperwork to DAAG-SPS until delivery to an organization in the CONUS are 65 days, 145 days elsewhere.

(b) The requested item is locally purchased when it does not have an FSN and the total cost is less than \$500. At least three weeks are needed to award a contract after the request is received from DAAG-SPS. Lead times for a vendor to begin distribution and an organization in the CONUS and elsewhere to expect delivery are the same as above. The total lead times are 72 days, 152 days elsewhere.

(c) A competitive bid can be utilized when the total cost for an item exceeds \$500, but is less than \$10,000. A minimum of three bids must be solicited. The lead time to award a contract is at least 30 days after the request is received from DAAG-SPS. Again, lead times for a vendor to begin distribution and an organization in the CONUS and elsewhere to expect delivery are the same as above. The total lead times are 81 days, 161 days elsewhere. Although a request may not specify a preferred item, the requestor could desire a more expensive viewer than the one selected on the basis of lowest bid. In this case the requestor is required to justify in writing why the less expensive item does not satisfy his needs. The award would be delayed between 17 and 55 days. Properly describing in the specification an item that meets the minimum requirements and submission of specific item justification (sole source justification), if applicable, at time of request alleviates procurement cycle time. A complete procurement action request receives faster service.

(d) The Federal Supply Schedule can be employed when the total cost for an item exceeds \$500, but is less than \$10,000 and the Maximum Order Limitation (MOL) is not exceeded. Special item number 21-21 in Class 6730 is reviewed to determine if any vendors meet the specifications and requirements. If so, the least expensive is selected. All lead times and total lead times are the same as above. DSSW initiates a competitive bid or forwards responsibility to GSA when either none of the vendors meet the criteria or the MOL is exceeded. It takes 10 and 5

days, respectively, to determine this. The lead time to award a contract on a competitive bid in each case is increased to at least 35 days. Lead times for a vendor to begin distribution and/or organization in the CONUS and elsewhere to expect delivery are the same as above. Total lead times are increased to at least 80 days, 166 days elsewhere.

(e) If the responsibility is forwarded to GSA, the lead time to award a contract in each case is at least 125 days. It takes one week for GSA to receive the paperwork from DSSW. Other lead times are the same as above. The total times are at least 183 days, 263 days elsewhere. GSA is also responsible for procurement when the total cost for an item exceeds \$10,000. It takes one week for GSA to receive the paperwork from DSSW. The lead time to make an award after the request is received is at least 120 days. Other lead times are the same as above. The total lead times are at least 178 days, 258 days elsewhere.

(4) Major command procurement procedures are similar; however, certain lead times and practices will vary. The information presented uses Health Services Command as an example. If the decision were made to procure the viewers at major command level, it is imperative each be furnished an FSN (if appropriate), specifications, requirements, volume, justification, and if possible, an approximate cost for each item type. The command prepares and forwards a DF to supply. The lead time is as long as it takes to prepare the paperwork. Supply prepares a DD Form 1155, Purchase Order, and if an item can be identified by an FSN, a DA Form 2765, MILSTRIP. The paperwork is sent to procurement. The lead time is 5 days. Procurement has several alternatives for procuring the viewers:

- o Contact the nearest distribution depot.
- o Purchase the requested item.
- o Competitive bidding.
- o Consult the Federal Supply Schedule.
- o Formal solicitation.

(a) The nearest distribution depot is contacted when an item, regardless of its total cost, has an FSN. The on-hand quantity is distributed. If either the item is not stocked or the on-hand supply is insufficient to meet the demand, a backorder occurs. Backorder lead time is at least 90 days. The lead time for the depot to receive a request is two weeks. Another two weeks is needed to begin distribution. The command can expect delivery between 50 and 90 days and an organization within the command 15 days later. The total lead time from supply to delivery to an organization within the command is between 98 and 138 days.

(b) The requested item is purchased when it does not have an

FSN and the total cost is less than \$500. At least three weeks are needed to award a contract after the request is received from supply. The lead times for a vendor to begin distribution and the command and an organization within the command to expect delivery are the same as above. The total lead time is between 105 and 145 days.

(c) A competitive bid can be utilized when the total cost for an item exceeds \$500, but is less than \$10,000. A minimum of three bids must be solicited. The lead time to award a contract is at least 30 days after the request is received from supply. The lead times for a vendor to begin distribution and the command and an organization within the command to expect delivery are the same as above. The total lead time is between 114 and 154 days. Although a request may not specify a preferred item, a command could desire a more expensive viewer than the one selected. The command is required to justify in writing why the less expensive item does not satisfy its needs. The award would be delayed between 17 and 55 days.

(d) The Federal Supply Schedule can be employed when the total cost for an item exceeds \$500, but is less than \$10,000 and the MOL is not exceeded. Special item number 21-21 in Class 6730 is reviewed to determine if any vendors meet the specifications and requirements. If so, the least costly is selected. All lead times and the total lead time are the same as above. Procurement initiates either a competitive bid or a formal solicitation when either none of the vendors meet the criteria or the MOL was exceeded. It takes 10 and 5 days, respectively, to determine this. The lead time to award a contract on a competitive bid in each case is increased to at least 35 days. Other lead times are the same as above and the total lead time is between 119 and 159 days.

(e) If a formal solicitation is used, the lead time to award a contract in each situation is at least 125 days. Other lead times are the same as above. The total lead time is between 209 and 249 days. A formal solicitation is also used when the total cost for an item exceeds \$10,000. The lead time to make an award after the request is received from supply is at least 120 days. Other lead times are the same as above. The total lead time is between 204 and 244 days.

(5) In support of the requirement to provide funding sources for acquisition of viewers and viewer-printers the following information has been gathered. There are five funding alternatives available; TAGCEN, MACOM, FOA, the Comptroller of the Army (COA), or the Army Productivity Improvement Program. Each would be an unfinanced requirement. An unfinanced requirement is items or articles considered necessary by the installation, but which go unfunded.

(a) Should TAG decide to be responsible for procurement of viewers, Administrative Management Directorate, Publications Directorate, or both could be directed by TAG to provide funds.

TAG Form 1-8 is prepared and sent through the Director to TAG. After the paperwork is approved, it would be returned to the Director and forwarded to TAG Comptroller, Appropriations, Budget and Accounting Division (DAAG-COB). If both Directorates provide funds, each prepares TAG Form 1-8.

(b) If TAG decides each FOA and MACOM is to be responsible for its individual viewers, the procedures at TAGCEN are the same as described above.

(c) If TAG determines the acquisition of the viewers warrants a high priority and sufficient funds are not available, TAG could request funds from the Army Chief of Staff.

(d) The Army Productivity Improvement Program is a major area of emphasis within the Army. The program includes Productivity Enhancing Capital Investment (PECI) opportunities. There are three categories. The third category identified as major is appropriate for IMPACT II. Projects must exceed \$900,000 with payback within five years. This study has identified a potential requirement for initial investment of \$7,325,000 for viewers.

(e) Other alternatives were researched and determined not to be feasible. In addition to the major category described above, the other two are the Quick Return on Investment Program (QRIP) and intermediate. QRIP must have a payback within five years and cost less than \$40,000. Intermediate must have a payback within five years and cost less than \$900,000.

(f) Office Secretary of the Army (OSA) funds are not available as the money can be used only for departmental activities. The study's scope is not limited to DA staff.

(g) HQDA funds are not available. The TAG Comptroller in the past has been able to request the Comptroller of the Army to reprogram funds for TAG and TAGCEN unfinanced requirements. However, this adjustment of Annual Funding Programs, called the Mid-Year Budget Execution Review, has been discontinued.

e. TASK -- Identify dual lens and other special requirements.

(1) As written the task only superficially touches on the single most limiting factor associated with placement of information in microform once the premise that quality microforms can be consistently produced is accepted. The task has been rewritten because there is a responsibility to present not only the special requirements, but, more importantly the minimum requirements for viewing equipment. The rewritten task statement is:

- o Identify requirements, minimum and special, microfiche viewers.

(2) Microfiche viewers are available in many sizes, shapes and configurations; however, not all will meet environmental constraints the Army must function in. All microfiche viewers and viewer-printers can be used either indoors or under cover, provided normal light and power is available. Conversely, few viewers can be used outdoors, unless power is available. Therefore, the environment must be used as a basic element in describing requirements.

(3) Viewers and viewer-printers for individual use indoors or undercover where 115 volt or 230 volt, 50 or 60 cycle power is available are covered by military specifications.

(a) Any microfiche viewer meeting the requirements of Military Specification MIL-V-80240B (Viewer, Microfiche) is an acceptable viewing device for indoor or undercover use where 115 volt or 230 volt, 50 or 60 cycle power is available. Viewing devices not meeting, at a minimum, the referenced specification or an Army approved commercial commodity acquisition equivalent will not meet current or future Army needs. The specification describes two types and three kinds of viewers. Type I is a viewer providing 100% blowback (size of image is same as original information). This viewer is recommended in cases where prolonged daily use is required. The viewer is available with either front or rear projection. Front projection is recommended for persons who wear glasses or where there is high ambient light in close proximity to the viewing device. However, the rear projection model is provided with a light shield to cut down on screen reflection caused by ambient light. The Type II viewer provides 75% blowback of images. This viewer is recommended in instances where use is intermittent. The specification currently provides for rear projection models only. However, any front projection viewer meeting all requirements other than the rear projection requirement of the Type II portion of the referenced specification would be an acceptable item.

(b) Any microfiche viewer-printer meeting the requirements of Military Specification - Viewer/Printer, Microfiche (24X and 48X), MIL-V-80241A is an acceptable viewer-printer device, for indoor or under cover use where 115 volt or 230 volt, 50 or 60 cycle power is available. Viewer-printers not meeting at a minimum the referenced specification or an Army approved commercial commodity acquisition equivalent will not meet current or future Army needs. The referenced specification describes a viewer-printer providing 100% blowback of 8.5 x 11 inch pages filmed at 24:1; however, if the original information area committed to film was greater than 11"x11" (14"x11") only an area of 11"x11" will be displayed due to screen size limitation. Additionally, the viewer-printer will provide a 75% blowback of information filmed at 48:1. Information areas up to 14"x11" committed to film at 48:1 will be fully displayed. The blowback of a paper print produced from a 24:1 microimage will not be less than 92% and the blowback of a paper print produced from a 48:1 microimage will not be less than 71%.

(c) Viewing equipment described in paragraph (a) and (b) will meet all minimum, standard, normal use requirements for indoor or under cover situations where light and power are available. However, there are situations or circumstances where microfiche will be used indoors or under cover for which special requirements exist. At this writing there does not exist federal or military specifications describing equipment that meets these special requirements. However, certain facts are available that provide direction toward prescribing minimum equipment requirements to satisfy any given situation. For several years now the size, formats and reduction ratios of microfiche have been prescribed by military standard. Microform formats, MIL-STD-399A limits microfiche formats and reduction ratios produced by or for any DOD activity. These microfiche formats and reduction ratios specified in MIL-STD-399A are the only ones approved for production by or for the DOD and are mandatory for all new microform applications. The microfiche formats and reduction ratios prescribed are and will remain the standard for the foreseeable future. Micropublishing will require the use of all standardized microfiche formats and reduction ratios. Current microfiche viewer and viewer-printer military specifications accommodate all standardized microfiche formats and reduction ratios. Therefore, viewers to meet special requirements should accommodate all standardized microfiche formats and reduction ratios in the same manner as existing military specifications. Two special requirements identified for indoor or under cover use within Department of Army are: self-contained portable viewers and microfiche projectors.

(4) Self-contained portable viewers afford flexibility in operation not available in desk top type viewers. Army functions are varied and their performance using information currently in paper form may require mobility for accomplishment. Examples are inventory, inspection and briefing. Power may not be readily available in these instances; therefore, continued performance using microform as the information medium establishes a requirement for self-contained microfiche viewers.

(a) Minimum required characteristics are:

- o Operate on 115 volts and 230 volts, 50 and 60 cycles and 12 volts DC.
- o Accept all microfiche formats described in MIL-STD-399A.
- o Capable of displaying data recorded at 24:1 and 48:1 in standardized microfiche formats (63, 98, 270 and 420 frame formats).
- o Display surface of sufficient size for viewing at least one full microimage produced at 24:1 or 48:1 (63, 98, 270 and 420 frame format).

- o Dual lens with provision for manually operated shifting between the two magnifications.
- o Line marker on the viewing screen at approximately the center and extending the width of the viewing screen.
- o Lens, platen glass, film carrier, screen and other moving parts affixed in such a manner as to prevent their accidental removal during use or transport.
- o Lamp easily accessible, replacement not requiring more than five minutes without the use of special tools.
- o Provide storage for spare lamp.
- o Film carrier self opening and front loading.
- o Circuits suitably protected by circuit breaker or fuse (a resettable device is preferred), if fuses used two spares must be provided and a retainer for same.
- o Constructed of shatter resistant or other material not easily broken or bent. Materials should not support combustion.
- o Magnification of at least 18X and 36X. At 18X one full frame of the 63 frame format (24:1) must be displayed. At 36X one full frame of the 270 frame format (48:1) must be displayed.
- o XY positioning indexes for 24:1, 98 frame format and 48:1, 270 frame format.
- o Internal rechargeable 12V DC power supply, automatically charged when used in normal 115V, 60 cycle power mode.
- o Smooth focus mechanism free of backlash and not requiring adjustment when moving from any image to another image on the same microfiche.
- o Meet the requirements of paragraph 4-10, 4-13, 4-14 and 4-17 of MIL-V-80240B.
- o Weight including internal power supply not to exceed 20 pounds.
- o Physical size in a transport mode not to exceed 15"x18"x5".

(b) Additional desired characteristics which would further improve the utility and quality of the device.

- o 24X and 48X magnification instead of 18X and 36X.
- o XY positioning indexes for 63, 98, 270 and 420 frame formats instead of only 98 and 270.
- o Operate on 24 V D C.
- o Ability to use as a microfilm projector.
- o All characteristics listed in MIL-V-80240B not requiring deletion due to nature of device.

(5) Microfiche projectors like the self-contained portable viewer meet application requirements not satisfied by the common individual microfiche viewer. Publications are used in diverse environments; their conversion to microform will change and improve current approaches to training in the Army. Publications are one of the basic elements of all training material, in microform they are ready made training aids for the instructor if a microfiche projector is available.

(a) Minimum required characteristics are:

- o Accept all microfiche formats described in MIL-STD-399A.
- o Capable of projecting one complete frame of information recorded at 24:1 and 48:1 in the standardized formats (63, 98, 270 and 420 frame).
- o Lens, platen glass, film carrier, and other moving parts affixed in such a manner as to prevent prevent their accidental removal during use or transport.
- o Film carrier self opening.
- o Circuits suitably protected by circuit breaker or fuse, if fuses are used two spares must be provided as well as a retainer for same.
- o XY positioning indexes for 24:1, 98 frame format and 48:1, 270 frame format.
- o Smooth focus mechanism free of backlash and not requiring adjustment when moving from any image to another image on the same microfiche.
- o Meet the requirements of paragraph 4-17 of MIL-V-80240B.
- o Project an image using 10 point type on a screen that is legible at a distance of 20 feet in a semi dark room.

(b) Additional desired characteristics which would further improve the utility and quality of the device.

- o Carrying handle.
- o XY positioning indexes for 63, 98, 270 and 420 frame formats instead of only 98 and 270.
- o All characteristics listed in MIL-V-80240B not requiring deletion due to nature of device.

(6) Minimum requirements for viewers thus far described, with the exception of the self-contained portable viewing device will not meet any field use situations unless 115 volt or 230 volt, 50 or 60 cycle power were available. With power available the Type I front projection viewer described in MIL-V-80240B could be used out of doors in dry weather. Generally speaking, microfiche viewers are not designed for use in inclement weather. The self-contained portable viewer offers the greatest potential for general use out of doors.

(a) Minimum additional required characteristics necessary to bring previously described self-contained portable viewer to a point of being acceptable for general use out of doors are:

- o Optional/additional power cord(s) to permit use of external 12V DC or 24V DC power supplies such as those found in vehicles. Cord(s) would require alligator like clips for attachment to source. 12V source. 12V DC cord would require resetable over voltage protector built in to guard against inadvertent damage of viewer if connected to 24V DC. 24V DC cord would require voltage step-down to 12V DC.
- o Suitable inclosure to protect viewer from elements. Color opaque except portion of front panel used for viewing. If lightweight plastic type bag were used it could be stowed inside viewer.

(b) Additional desired characteristics which would further improve the utility of the device are:

- o Reduction in total weight to ten pounds.
- o Three hour battery life.

(7) Only one other viewer requirement remains to be defined and described. The portable handheld microfiche viewer, is, it appears, a real requirement based on past and current efforts to develop one. Devices fitting this category do exist; however, their type are very limited in application. We are referring to those handheld viewers not providing a viewer screen. Eyepiece viewers, also referred to as squint viewers, are abundantly available, some are of very high quality. They are intended for

very intermittent use (limited reference, not reading). These viewers are available in two basic models: battery powered and ambient light. 200 microfiche and an ambient light viewer occupy less than 40 cubic inches and weigh less than 2.5 pounds while providing 84,000 pages of information. Your effectiveness would be impaired using this device in most operational situations, but, from a survival standpoint it would get you through. Handheld portable viewers having a display screen and magnification of adequate proportion to be eligible candidates for entry into the Army as full field use microfiche viewers are only in development or experimental stages.

(a) Minimum required characteristics of a portable handheld eyepiece type viewer is legible viewing of one full microimage produced at 48:1.

(b) Minimum required/acceptable characteristics of a handheld portable viewer having a display screen capability are currently the subject of a separate research and development project not a part of this study. Micropublishing of products requiring use of this device will not be undertaken except in the form of test material until such time as the device(s) have been proven under full field test.

f. TASK -- Determine types and quantities of microfiche viewers and viewer-printers that must be acquired to outfit the active Army in garrison and/or field environments under each of the following conditions:

- o All applicable administrative publications issued on microfiche.
- o All applicable doctrinal and training publications issued on microfiche.
- o All applicable technical publications issued on microfiche.
- o All applicable supply publications issued on microfiche.
- o Provide a detailed cost estimate for the four conditions above.

(1) Development of the survey used to arrive at the conclusions presented in support of this task is covered in paragraph 2-2b(2).

(2) Execution of the survey is covered in paragraph 2-2c(1).

(3) Results of the survey (raw data) are shown in Figure 2-3, Page 25. Response was 82%.

(4) Survey results indicate that the total ultimate need for microfiche viewers can be estimated (through extrapolation) at

ARMY MICROFICHE VIEWER EQUIPMENT SURVEY RESULTS

RAW DATA 82% RESPONSE

NUMBER OF MICROFICHE VIEWERS NOW AVAILABLE FOR USE	37,835
NUMBER OF MICROFICHE VIEWERS DUE IN	6,835
EXPECTED NEED FOR ADDITIONAL VIEWERS IF ALL PUBLICATIONS WERE ON MICROFICHE	78,973
EXPECTED NEED FOR ADDITIONAL VIEWERS IF ONLY PUBLICATIONS INDEXED IN DA PAM 310-1 ARE CONVERTED	48,000
EXPECTED NEED FOR ADDITIONAL VIEWERS IF ONLY PUBLICATIONS INDEXED IN DA PAM 310-3 ARE CONVERTED	35,707
EXPECTED NEED FOR ADDITIONAL VIEWERS IF ONLY PUBLICATIONS INDEXED IN DA PAM 310-4 ARE CONVERTED	43,093

FIGURE 2-3

150,000; some 54,000 are currently on hand. Proper interpretation/analysis of the reported information as well as other facts directly related to publications needs substantiate survey results. The following information obtained from Publications Directorate and the Baltimore Publications Distribution Center has a direct bearing on the above estimate.

(a) DA PAM 310-1, Index to Administrative Publications, is printed every four months. Some 108,500 copies were distributed between the last print cycles.

(b) DA PAM 310-2, Index to Blank Forms, was last printed in a quantity of 77,500. It is printed every four months.

(c) DA PAM 310-3, Index to Doctrinal and Training Publications, was last printed in 73,150 copies. It is printed every six months.

(d) DA PAM 310-4, Index to Technical Publications, was last printed in 61,800 copies. The Index is printed every six months. Due-outs (back orders) for this publication exceed 25,000 copies to date. December 1978 issue was last issue printed in paper.

(e) Early in 1977 the Publications Directorate conducted a survey of DA PAM 310-4 (Index to Technical Publications) users. Response to the survey showed that over 71% of the users had immediate access to microfiche viewers and could use the publication in microfiche; sixty percent indicated a use for DA PAM 310-1, 310-2, and 310-3 in microfiche.

(5) While it appears that needs indicated by the survey are reasonable, any attempt to predict quantities by specific type of equipment needed, without a cost prohibitive in-depth survey, would be little more than an educated guess. However, with a reasonable degree of certainty we foresee the need for 58,000 new indoor/under cover type viewers (in addition to the presently existing 54,000) to support administrative type publications in microfiche. Of this number 55,000 might easily be the Type II viewer described in MIL-V-80240B, the remainder, self contained portable viewers and microfiche projectors, as described in paragraphs 2-2e(4) and (5). The survey indicated that some 43,500 viewers are needed to support doctrinal and training publications. There is a possibility that this number could all but disappear through absorption if those users also use administrative publications. On the other hand, the number identified may be in support of training and constitute a real requirement. If the requirement is real, as many as 40,000 would be of the type I and II described in MIL-V-80240B, the remainder being self-contained portable viewers and microfiche projectors meeting the requirements of paragraphs 2-2e(4) and (5). Microfiche viewing equipment to support technical publications is identified as 52,000 units, this number will be reduced by some unknown number through acquisition of viewers in support of administrative publications. No prediction of quantity by type can be given for this class of publication; however, the full

spectrum of viewers described in paragraph 2-2e will be required to support this publication series. Much equipment and publication development work remains to be accomplished prior to micropublishing technical publications.

(6) Following is a detailed cost estimate for viewer requirements by publication category and type:

(a) Administrative publications, 58,000 viewers.

- o 55,000 Type II MIL-V-80240B
Estimated cost \$125.00/each
in quantity through Defense
Supply, Richmond, VA \$6,875,000
- o 2,500 self-contained portables
Estimated cost \$350.00/each
in quantity via competitive bid \$ 875,000
- o 500 microfiche projectors
Estimated cost \$150.00/each via
competitive bid \$ 75,000

Potential cost of viewers (administrative publications) \$7,825,000

(b) Doctrinal and Training Publications, 43,500 viewers.

- o 40,000 Type I and II MIL-V-80240B
Estimated cost \$125.00/each in
quantity through Defense Supply
Richmond, VA. \$5,000,000
- o 3,000 Self-contained portables
Estimated cost \$350.000/each in
quantity via competitive bid \$1,050,000
- o 500 microfiche projectors
Estimated cost \$150.00/each in
quantity via competitive bid \$ 75,000

Potential cost of viewers (Doctrinal and training publications) \$6,125,000

(c) Technical publications, 52,000 viewers.

Potential cost of viewers (Technical publications) \$10,000,000

(d) Supply publications, no additional viewer requirement

(e) Viewer-printers, potential for up to 5,000 units MIL-V-80241A.

Estimated cost \$1,000/each in quantity, through
Defense Supply, Richmond, VA. \$ 5,000,000

2-3 PUBLICATIONS USE.

a. The five tasks grouped under this major topic touch functional aspects of the Army at all levels. Questions deal with the current users of microforms and micropublications, environmental, human and other factors that might limit the conversion, the requirements for split mode and continued paper only. A final question requires that a determination be made regarding the storage and transport requirements of micropublications used in the field. Portions of the tasks were answered from the viewer equipment survey and interviews. Past experiences of study members and their knowledge of publications and micrographics contributed a major portion of the information leading to the findings.

b. TASK -- Characterize current Army microfiche viewer usage by developing categories of users, and identify those that use microfiche publications.

(1) To our knowledge, all microfiche viewers in the Army are currently used under cover or indoors, most of them, indoors. Only very small quantities of self-contained portable viewers affording unlimited freedom in use have been acquired, primarily for test or demonstration.

(2) Microfiche viewers can be found in every functional area of the Army. The heaviest concentration is found in supply and maintenance functions, in both functions the product is supply catalogs. Management information users are the next largest user of microfiche viewers. The functional areas are personnel, logistics, finance and medical. Other current users of microfiche viewers are for the most part administrative, engineering, research and libraries.

(3) Supply catalogs are the major micropublications in use and for the most part used in supply functional areas. The DOD Standardization Directory and DOD Address Directory can be found in use in all functional areas, as can scientific and technical information.

c. TASK -- Identify and categorize environmental parameters and human factor requirements for active Army use of micropublications.

(1) Two general types of operating conditions in which micropublications might be used are: garrison and field. The major environmental parameters of concern for either type will be temperature and chemical.

(2) The garrison condition can be broken down further into headquarters activities and maintenance activities. The latter may be further divided into: shop office, shop repair station,

and outdoor repair site.

(a) Temperature extremes should pose no significant problems in the use of conventional publications except under the outdoor repair site condition. Extremely low temperatures could impair fiche carrier operation, increase the susceptibility to damage of plastic viewer cases, reduce the battery of non-ambient portable viewers and make fiche brittle. Further, a human factors problem may occur if protective clothing, e.g., gloves, mittens, makes fiche and carrier manipulations difficult. No other human factor problems are anticipated which can not be handled by reference to the published human factors literature.

(b) Chemical hazards, e.g., grease, solvents, etc., may pose problems within the maintenance activities. These will be primarily nuisance type, e.g., wipe hands before handling fiche. However, it may be necessary to keep additional duplicate sets available in extreme cases where fiche destruction by use is anticipated.

(3) Field conditions may be broken down into sheltered and unsheltered. Sheltered condition should not be significantly worse than headquarters activities which pose no problem. Problems similar to those encountered in maintenance activities can be expected for unsheltered conditions.

(4) The published human factors literature contains much information on viewer variables, e.g., screen viewing angle, projection type, etc. This data should be adequate to handle most problems encountered.

d. TASK -- Identify and state the factors which limit the conversion of publications to microfiche.

(1) Simply stated, there are no production/creation process limitations associated with the conversion of paper publications to a microform. However, the ability to use those micropublications under all situations found throughout the Army is currently doubtful. We are prepared to produce and supply publications in microform with confidence as to their usability, to those publications users with access to power and the security of cover. This environmental limitation is imposed by types of viewing devices presently available.

(2) The equipment limitation immediately imposes a limitation on the types of publications that can be converted to microform. Some supply catalogs have existed only in microform for almost ten years. Therefore, further conversion is considered safe. Administrative publications, by the nature of their use (indoor or under cover) in particular publications indexes present the single greatest ease of conversion to microform given the types of viewing devices currently available.

Some doctrinal and training publications whose use are limited to an indoor environment can be converted as can technical publications (depot type).

(3) Within the task is the word "conversion", conversion implies taking current publications in print and producing from them microfiche. This approach is not cost effective, the publications already exist, creation in microform would be an unnecessary expense. Production of microfiche to fill reprint requests is also not considered to be in the best interest of the users because type faces and sizes used in Army publications (for the most part) do not lend themselves to the production of quality microforms.

(4) Publications cannot be converted to microform, they must be created for production in microform. A poor quality microform will not assist in overcoming the natural resistance to change (microfiche as a replacement for paper).

e. TASK -- Identify the conditions which will require whole or partial paper copies of publications in addition to microfiche, and evaluate these to determine a percent breakdown and if they can be eliminated.

(1) This task without doubt opens the door on the most controversial subject associated with the use of microform. Given the choice of paper or microform, most paper publications users will take paper. As an example of resistance to change (reluctance to use microform) we offer the following:

In 1975 approval was requested and granted to micropublish SB 700-20 Army Adopted/Other Items Selected for Authorization/List of Reportable Items. Approval was also given for each user of this publication authority to acquire a viewer or viewer-printer from Defense Supply as required. The chart at Figure 2-4 tracks the history of SB 700-20. Announcement of implementation of this publication as a micropublication was via a DA Circular which also prescribed method of requesting paper instead of microfiche publication. Prior to the first formal issue of the micropublication, recipients were asked to validate their requirement for the publication, the result was a drop in the requirement by 8,513 copies (March 1975, 33,000 copies, March, 1966, 24,487 copies, (987 paper and 23,500 fiche)). Between the time of announcement of the publication in microfiche and actual implementation 987 paper copies had been approved. As can be seen from the chart, the number of paper copies grows with each subsequent issue. The use of paper copies is unwarranted considering viewers and viewer-printers were acquired or are authorized. This micropublication is slowly reverting to paper through desire for paper, not need. If 2,000 of the paper users have viewers acquired in support of this micropublication the minimum investment was \$200,000 (\$100 per viewer). Amortizing the cost over five years is a yearly cost of \$40,000 or \$20,000 per issue plus \$7,107 for 2,000 paper copies of the publication plus \$16,707 for the fiche copies, for a per issue cost of

SB 700-20

ISSUE DATE	PAPER COPIES	COST IN PAPER	COST IN FICHE	FICHE COPIES
MAR 79	2,464	\$ 11,115	\$20,873	24,000
SEP 78	2,044	\$ 7,107	\$16,707	24,000
MAR 78	1,670	6,696	13,212	24,000
SEP 77	1,580	11,117	17,763	24,000
MAR 77	1,489	13,078	16,960	24,000
SEP 76	UNK	UNK	15,996	25,000
MAR 76	987	10,496	19,029	23,500
SEP 75	27,000	85,999	000	000
MAR 75	33,000	103,567	000	000

FIGURE 2-4

\$43,814. This is 50% of the cost for 27,000 copies printed in September 1975. Given the opportunity (choice) to have paper publications, most paper publications users will take paper, even when able to use microfiche. Microform means change and it doesn't fit with the "But-I've-always-done-it-that-way" syndrome. Resistance to change is so great, that if microform were the current norm, you wouldn't be able to give a paper publication away.

(2) In the previous task, requirements for continued printing of paper copies of a publication produced in microform were not identified for these reasons:

(a) The success of supply catalogs in microform.

(b) The availability of viewer-printers for making the occasional paper print (not copying).

(c) No micropublished product has returned to paper.

(d) No publication has been micropublished that cannot be used in microform.

(3) That portion of the task referring to a possible need for whole paper copies in addition to microfiche is ludicrous. If a need could be established for continuing 100% distribution in paper, the publication would not be considered for micropublishing. However, it is plausible to consider parallel distribution of paper and microfiche as a confidence building factor or selling tool. This must be limited to the initial fiche distribution of the particular publication being implemented. Purpose is orderly transition and proving usability. Once the mode decision is made, dual mode must be terminated.

(4) Partial paper/microfiche or split mode as it is referred to, is basically a bad idea unless someone else is footing the bill, that is not the situation in the Army. Economically speaking, split mode cannot be justified for a single micropublication, for that matter, neither can micropublishing because of the viewing equipment investment. The Army publications system, however, is not one publication but thousands of publications and this micropublishing study addresses the whole publishing system from creation through use. There are sufficient publications in the Army that can be micropublished and utilized in microform to offset the viewer investment. The more publications that can be effectively micropublished, the sooner savings through micropublishing will be realized (speeds amortization of viewer investment). However, degree of savings is directly proportional to degree of split mode permitted (after amortization of viewer investment), and a crossover point can be found for each publication where split mode would cost more than a paper mode alone.

(5) Conditions which must be present prior to proceeding on

a split mode course of action are:

(a) Publication is not one identified as contributing to payoff of viewer investment. Only that portion of a split mode publication that is in microform generates a reduction in publication costs that can be used to offset viewer cost. In general, several publications in microform, delivered to the same user over a number of years, will be required to absorb viewer investment.

(b) Microfiche only, would be a deterrent to accomplishment of functional tasks for portion of group requiring publication.

(c) Split mode determined to be more cost effective than paper mode.

(d) Readiness posture of Army is reduced through use of microfiche mode only.

(e) Viewers do not exist which meet all environment use requirements.

(6) The decision to micropublish a particular publication cannot be arbitrarily made; different conditions require different solutions; what is proposed is an approach which has been found highly successful in arriving at a sound decision. That approach is:

(a) Identify publication as candidate for micropublishing. See Figure 2-13, lower the category number, greater the potential, 1A is best situation. Page count over 200 is excellent.

(b) Determine distribution quantity and frequency. Frequent revision is an indication of need for current information, as is a large number of changes over one year. Large quantities also indicate good candidates for micropublishing.

(c) Determine environmental conditions under which used. Must be able to provide viewer support.

(d) Determine costs in paper form (preparation, printing, handling and distribution).

(e) Prepare economic cost comparison, paper vs microfiche.

(f) Prepare sample publication in microfiche based on current technology and experience gained from similar publications efforts.

(g) Make proposal for micropublishing to proponent and offer copies for test.

(h) Refine publication as necessary to meet user needs.

(i) Overcome as practicable, obstacles to micropublishing implementation.

(j) If necessary, consider initial distribution in parallel mode.

(k) If necessary, consider split mode.

(l) Regardless of proponent decision on micropublishing, solicit other publication candidates.

(7) Each publication or group of publications is unique. The approach in paragraph 6 provides an opportunity to establish, test and reduce quantity of publications which will require split mode or paper mode only.

f. TASK -- Determine the microfiche storage and transport requirements for a representative cross section of active Army battalions and provide a detailed cost estimate for each.

(1) Microfiche storage requirements for active Army battalions stated below are based on the following assumptions and facts:

(a) Only the storage of Army publications for active use is considered.

(b) The major difference between battalions will be in terms of equipment maintained.

(c) The CABL concept has been implemented.

(d) The unit must operate in both garrison and field environments.

(e) Fiche storage units will be provided for each viewing device.

(f) Support of training literature is not included at this time.

(g) Current usage of publications will not change markedly.

(2) Current practice in a battalion is to maintain central libraries.

(a) Administrative and doctrinal publications library is located at Personnel Administration Center (PAC) in the headquarters area.

(b) Technical publications library is located at motor pool or maintenance shop. However, key operational personnel will keep publications that are used frequently at their work area. Maintenance mechanics may also have personal copies of high usage technical manuals (TM).

(c) The distribution of viewers for total or near total conversion should follow the publication distribution use indicated above or other currently established practice if the status quo is to be maintained.

(3) The fiche storage requirement will be dictated by the number and distribution of viewers. Information gained during the IMPACT I User Field Test is the basis of the requirement example used to generate cost estimates. Therefore, the proposed battalion requirement is as follows:

3-5 High capacity (300-500 fiche) containers for garrison use.

4-6 Low capacity (50-100) fiche) containers, i.e., panels, fiche boxes, binders, for field and garrison use.

3-5 High capacity field carry cases or suitable adapters for the garrison containers, for use in the field.

(4) Two cost estimates are provided for the example given above.

(a) Low cost - use cardboard file boxes and pressboard mini-binders.

5 microfiche file boxes with tabs	\$ 6.20/each	\$ 31.00
6 index boxes with tabs	\$ 1.45/each	\$ 8.70
5 field carry cases	\$29.95/each	\$149.75
Total		\$189.45

(b) High cost use touch fan type files and easel binder and panels.

5 touch fan files	\$81.96/each	\$409.80
6 easel binder and panel	\$17.40/each	\$104.40
5 cover sets for files	\$ 7.00/each	\$ 38.00
Total		\$552.20

(5) The estimates given above are applicable to most infantry and light mechanized battalions. However, some adjustments will be necessary under the following conditions:

(a) If field conditions are not environmentally severe, the low cost estimate can be significantly reduced by eliminating the field carry cases.

(b) Both estimates should be adjusted upward for heavy mechanized and support battalions.

2-4 PUBLICATIONS REGULATORY REQUIREMENTS.

a. Seven regulatory tasks are grouped in this category. Questions address current policy (paper), future policy (paper and microfiche), procedural requirements (implementation and ongoing), and standards and specifications (paper and microfiche). The most important of the tasks deals with paper copy generation from microfiche.

b. TASK -- Determine what regulations and/or requirements must be complied with to initiate conversion of Army publications to microfiche and what documentation must be supplied.

(1) All government printing including micropublishing is subject to printing and binding regulations of the Joint Committee on Printing (JCP). DA printing is governed by Army Regulations 310-1, 2, and 3. These regulations address acquisition of micropublishing equipment, describe policy governing production of over 250 microform units, and reference AR 340-22. This last AR describes the Army Micrographics Program and the approval process required for microform systems, (including micropublishing systems).

(2) Regulatory requirements:

(a) Government Printing and Binding Regulations.

(b) AR 310-1, Publications, Blank Forms, and Printing Management.

(c) AR 340-18, The Army Functional File System.

(d) AR 340-22, The Army Micrographics Program.

(e) TM 12-257, Microfilming of Records.

(3) Documentation requirements:

(a) DA Form 1500-R, Microform Document or Information System (MICRODIS) Request.

(b) Complete description of current system.

(c) Text/study conceptual papers if the study may result in establishment of a micrographic system.

(d) Economic and/or cost analysis.

(e) Joint Committee on Printing (JCP) approval/authorization is required for in-house reproduction in excess of 250 microform production units, or for acquisition of Computer Output Microform (COM) devices when their purpose is for micropublishing.

c. TASK -- Identify and state policy on changes, message changes, reprint, local supplements and illustrations.

(1) A review of AR 310-1, Publications, Blank Forms, and Printing Management, provides the following:

(a) "Changes.

A publication will be amended or added to by the publication of changes. This information will be published as numbered changes to the basic publication. Serious errors will be corrected immediately by published changes. Minor changes not affecting policy or doctrine will be allowed to accumulate and will be published in the next significant change to or revision of the publication.

When changes to one publication affect other publications to the extent that they must be modified, changes to all publications affected will be prepared and submitted for publication at the same time.

(b) Illustrations.

Illustrations will be used in publications when they contribute to a clear understanding of the subject matter or permit a substantial reduction of the narrative text. They are to be used only when they -

(1) Relate entirely to the business of the Army and are in the public interest.

(2) Relate directly to the subject matter and are necessary to explain the text.

(3) Do not serve to glorify an individual.

(4) Are professionally executed.

(5) Do not contradict or compromise Department of the Army policies regarding the sex, race, religion, or national origin of persons, either by gross caricature or innuendo.

(6) Are restricted to the minimum size necessary to accomplish their purpose.

(7) Are used to depict employees actually engaged in the performance of their official duties.

For departmental printing, The Adjutant General will insure that illustrations conform to the above requirements.

For field printing projects (including contract field printing), the agency head or major commander having jurisdiction over the facility where the project originates will insure that illustrations conform to

the above requirements. The commander may further delegate this responsibility as required. A copy of the justification for and approval of illustrations becomes a part of the printing requisition or part of the records described in paragraph 3-19 of AR 310-1. A copy of the justification for and approval of illustrations in contract field printing will be retained as part of the procurement file."

(2) Message changes. A Headquarters Department of Army Letter, 310-73-3, dated 10 August 1978 prescribes new policy on message changes to publications as follows:

(a) A policy change or other change to an Army Regulation will not be made by means of an interim electrical message change.

(b) An electrical message may only be used to advise of an impending change to a publication.

(3) AR 310-2, Identification and Distribution of DA Publications, provides the following information:

Section II Army Regulation Supplements, Paragraph 4-14.

"General.

This section prescribes policy and procedures for issuing supplements to Army regulations. Supplements are the medium of publication used by agencies and commands to issue to their headquarters and subordinate elements instructions required to implement Army regulations. The supplement system applies only to Army regulations. A supplement will implement only one Army regulation.

The supplement system became effective 1 February 1969. Command and agency publications, which implement Army regulations dated prior to 1 February 1969, will not be revised solely to convert to supplements. However, if the Army regulation which the command or agency publication implements is later revised and supplementation is directed or, permitted the command or agency publication will be rewritten as a supplement and the existing publication will be superseded.

Subordinate echelons will also use supplements to implement higher command or agency regulations on subjects not covered by an Army regulation. The procedures and format for Army regulation supplements prescribed in this section will be followed, as applicable."

(4) AR 310-3, Preparation Coordination, and Approval of

Department of the Army Publications provides the following information:

"Reprints.

Explanation. A reprint is a second or subsequent printing of the current edition of a publication or blank form to replenish stock levels at a US Army Publications Center.

Procedure. When the stock of a publication or blank form at a US Army publications center reaches a level that requires resupply action to maintain sufficient copies for requisitioning, the publications center will send a status request to the proponent for completion.

The proponent will review the publication or form for continued essentiality and currency. Based on the review and pending actions, such as a planned revision, the proponent will advise the publications center whether reprint action is required.

When a reprint of a looseleaf publication with existing changes is necessary, the publications center will provide two copies of the publication to the proponent. The proponent will prepare an updated copy by inserting all new and revised pages and removing the old and deleted ones. The reprint copy (the basic publication with all current changes incorporated) will be returned to the publications center.

Changes. Since reprint copies are used to fill resupply requisitions only, new changes to the existing edition of the publication or form will not be made in the reprint. If additions, changes, or deletions are required, they will be prepared and submitted to TAGCEN for printing as a numbered change or revision."

d. TASK -- Determine necessary applicable archival requirements.

(1) AR 340-18-2 requires permanent retention of records falling within the category: publication record set, file 227-01. The Publications Directorate has responsibility for maintaining publications record sets authenticated by The Adjutant General. The requirement directs that a record set of all publications created in a calendar year be assembled at the end of the calendar year and transferred to the Federal Records Center (GSA), Suitland, Maryland, 20409.

(2) Since no paper copies of micropublished DA publications will be printed, and no requirement for record sets (File 227-01) of these publications in paper form exists, a proposal for

handling the publications record set in microform has been prepared and forwarded to the Records Management Directorate, TAGCEN.

(3) The proposal includes:

(a) Archival testing in accordance with American National Standard (PH 4.8 (silver film).

(b) Retention of record set microfiche at HQDA (DAAG-PAP), Washington, DC 20314.

(c) No changes in maintenance/disposition of record sets except that microfiche will be handled in accordance with Federal Property Management Regulation 101-11.506 until retired or transferred.

(4) The Records Management Division has concurred in this approach to handling microfiche publication record sets.

(5) The National Archives and Record Service, GSA, (NARS, GSA) has been asked for, and has provided, mixed mode (paper and microfiche) retirement instructions.

e. TASK -- Determine and obtain all applicable standards and/or specifications for the preparation of manuscripts for hardcopy and microfiche.

(1) Standards and specifications for hardcopy preparation:

(a) AR 310-3 Preparation, coordination, and approval of Department of Army publications.

(b) MIL-M-63001 Manuals, Technical: Basic Issue Troop Installed or Authorized List, and Items List, Repair Parts and Special Tools List, and Consolidated Orgaoizational Repair Parts List.

(c) MIL-M-63030 Manuals, Technical.

(d) MIL-STD-12 Abbreviations for Use On Drawings, Specifications, Standards, and in Standards, and in Technical Documents.

(e) MIL-STD-15-3 Electrical Wiring Symbols for Architectural and Electrical Layout Drawings.

(f) MIL-STD-17-1 Mechanical Drawings.

(g) MIL-STD-17-2 Mechanical Symbols for

	Aeronautical, Aero-spacecraft and Spacecraft Use.
(h) MIL-STD-100	Engineering Drawings Practices.
(i) MIL-STD-1309	Definition of Terms for Automatic Electronic Test and Checkout.
(j) DOD 5200.1-R	Information Security Program Regulations.
(k) DOD 5200.20	Distribution Statements on Technical Documents.
(l) MIL-M-6304 (TM)	Manuals Technical Extension Training Materials for Integrated Technical Documentation and Training (IODI).
(m) MIL-HDBK-63038-1(TM)	Manuals, Technical: Technical Writing Handbook.
(n) MIL-HDBK-63038-2(TM)	Manuals, Technical: Technical Writing Style Guide.
(o) MIL-M-38784	Manuals, Technical: General Requirements for Preparation of.
(p) MIL-M-63035(TM)	Manuals, Technical: Front End Analysis.
(q) MIL-M-63036(TM)	Manuals, Technical: Operator's Manuals.
(r) MIL-M-63037(TM)	Manuals, Technical: Organization, Direct Support and General Support Maintenance (ITDT) -Flowchart, Logic Tree Troubleshooting.
(s) MIL-M-63038(TM)	Manuals, Technical: Organization, Direct Support and General Support Maintenance.
(t) MIL-M-63001(TM)	Manuals, Technical: Repair Parts and Special Tools List.
(u) MIL-M-63004(TM)	Manuals, Technical: Preparation of Lubrication Orders.
(v) MIL-M-63043(TM)	Manuals, Technical: Missile System Equipment Check Procedures.
(w) MIL-M-63044(TM)	Manuals, Technical: Missile System Equipment Unit-Under Test (UUT) Procedures.

(x) MIL-M-63050(TM) Manuals, Technical: Components of End Item, Basic Issue Items, Additional Authorizations and Expendable Supplies and Materials Lists.

(y) MIL-STD-155 Joint Photographic Designation System.

(z) MIL-STD-196 Joint Electronics Type Designation.

(2) Standards and Specifications for microfiche preparation:

(a) Federal Property Management Regulations; Title 41, Code of Federal Regulations, Part 101, Subpart 101-11.5, Microfilming.

(b) Federal Information Processing Standards Publication, Number 54, Computer Output Microform (COM) Formats and Reduction Ratios, 16mm and 105mm.

(c) Military Standard, Microform Formats, MIL-STD-399A.

(d) Military Specification, Microfiche; for Engineering/ Technical Data, Reports, Studies and Related Data, Requirements For, MIL-M-38748.

(e) Military Specification, Preparation of Equipment Publications Microfiche, MIL-P-60348(TM).

(f) Military Specification, Film, Microfiche, 48X, MIL-F-80242.

f. TASK -- Determine necessary specification (e.g., type fonts, sizes, formats, density per line/page, illustrations, oversize pages, use of color, etc) for hardcopy publications that will later be converted to microfiche through micropublishing.

(1) Micro-republishing is not an acceptable or necessary part of the plan to implement micropublishing of DA publications. Explanation/discussion follows:

(2) New or revised publications offer best targets for micropublication.

(3) Publications automation in the development stage (creation of manuscript) will provide flexibility to define characteristics (defined in task) for paper or microfiche at time of production.

(4) Micro-republishing is best employed for reprinting or to develop test publications (demonstration). Prior to reprint micro-republishing or publication automation should be considered. A publication falling into a group of publications that are being micropublished might be a candidate for micro-republishing if revision was unlikely. This would place

the group as a whole in one mode.

(5) Micro-republishing of paper publications would require the use of a printed copy of the publication because camera ready copy, in most cases, is not available. Printed copies do not provide copy quality necessary to produce microfiche of sufficient quality to gain user acceptability. Additionally, fonts and point sizes now in use for paper publications do not, for the most part, meet desired criteria for quality micropublications.

g. TASK -- Establish requirements and guidelines for the preparation of paper copies from microfiche masters.

(1) While producing paper copies from microfiche masters is not as controversial a subject as is publishing in split mode, it represents a greater threat to realizing economies identified through micropublishing. Nothing will destroy the economic portion of a micrographic system faster than the reconstitution of microform information onto paper. Paper printers (viewer-printers) used for this purpose cost, on an average, ten times what viewers without printing capability cost. The per page cost of producing paper copies on viewer-printers is approximately five cents. Personnel costs are also high: these devices are labor intensive (manually operated and very slow, producing one print per ten seconds). Viewer-printers are intended to fill requirements for occasional prints; they should not be used for copying whole documents.

(2) Acquisition and use of viewer-printers must be closely controlled. At the moment, the greatest drawbacks to their use are: low operating speed and insufficient print quality. However, a new line of products are being marketed capable of making paper copies from microfiche with the characteristics of those produced by paper copying machines. This reproduction equipment will sell from \$35,000 to \$125,000. Control of this new equipment will be even more important, if the benefits (savings) of micropublishing are to be realized.

(3) There is no question that some publications, particularly within the administrative area must be published in paper for most effective use. However, even these publications might be micropublished in part if portions were available in paper also. The question then would be how the hardcopy is to be distributed with the microfiche, or more important, how to make it available when needed. Since circumstances and need differ widely from publication to publication, no one solution or micropublishing decision can be arrived at. Micropublications must, in all cases, be made to fit particular publication situations as are the paper publications now.

(4) Occasional paper page prints of microfiche publications will continue to be needed. Microfiche viewer-printers can meet this need. The viewer-printer however, has speed, quality and size limitations in most cases. Other photographic processes

could, of course, be used to overcome these limitations, but most are time consuming and costly.

(5) Many publications carry reproducible forms, since it is less expensive to reproduce low usage forms locally than to stock and issue them. Publications with reproducible forms, however, may yet be micropublished, if some alternative means of acquiring/distributing the necessary forms is found. These possibilities should be considered:

- o Use of a viewer-printer to produce copies from microfiche publications.

- o Shipping copies of reproducible forms with microfiche publications.

- o Sending copies of forms to each publications control officer.

- o Preparing a paper publication containing all reproducible forms.

- o Preparing a microfiche publication containing all reproducible forms.

(a) Using a viewer-printer to produce a form is possible but may not be practical. The print would be usable but might be smaller than required for typewriter spacing. Form could be scaled up to counter this loss, except that there is no standardization in the print magnification of viewer-printers. Additionally, the maximum size that can be microfilmed while maintaining standard reduction ratio and format is 14"x11". Micropublishing costs would thus be doubled for those publications with forms and it would be necessary to print such forms in sections.

(b) Shipping a copy of the reproducible form with the microfiche publication might be considered, but has drawbacks. Two mediums of vastly differing sizes would be involved. Should the form be folded twice to conform to the fiche size or the fiche placed in an envelope large enough to accommodate the flat form? Shipping the two items separately would double handling, packing and distribution costs. Also, how would users file/maintain paper forms?

(c) Copies of reproducible forms might be issued to publications control officers. Distribution of the reproducible forms would be reduced, since all recipients of publication now receive a reproducible copy of each form. Control of forms would thus be increased, but distribution and supply might be impeded. If all reproduction of reproducible forms is handled through Army publications control officers, this approach would work better than the current system. But if other reproduction were otherwise authorized, this approach might be unmanageable.

(d) Our first thought when reviewing this task was to suggest creation of a looseleaf publication of all reproducible forms and distribute it to all publications control officers, field printing plants and reproduction facilities. That idea is good. It would remove reproducible forms from publications and provide greater control over local reproduction of forms, the number of copies would be limited, waste through destruction of publications by removal of reproducible forms is eliminated and micropublishing of all publications could be considered. The suggested limited distribution may inhibit acquisition of locally reproducible forms, if this is the case, then consideration could be given to making distribution to all publications account number holders, if costs were held down. The publication, though large, would require minimum maintenance.

(e) Preparation of a microfiche publication with reproducible forms until recently has not been considered to be realistic. Reasonably priced devices capable of producing high quality and quantity paper copies from microfiche at low page cost have now been marketed, however. In microfiche, reproducible forms distribution could be unlimited and yet be cost effective from the creation/distribution standpoint. This approach, if implemented, requires a large capital equipment investment. However, investment might be amortized. Forms printing, distribution, stocking and maintenance as currently accomplished may be the most cost effective method if only paper modes are available. But, as things change, as technology improves, publishing microfiche copies of all DA forms may be a better, more cost effective approach than is our current method. The concept is worthy of further study and a prototype test.

(6) Component Lists (CL's), sets, kits, and outfits publications have been suggested for micropublications. These publications number over 1,000; distribution ranges from a few hundred to over fifteen thousand. Each CL carries a reproducible over printed hand receipt which describes all items covered by the CL. These are used to provide faster and better small and special tools accountability. How will the receipts/accountability be affected by micropublications?

(a) Paper distribution of hand receipts to accompany microfiched CL's is, of course, a possibility. It would of course be useful to include a copy of the hand receipt in microfiche CL's as a checklist or point of comparison against the paper receipt.

(b) Printing paper copies from microfiche viewer-printers has been covered in 2-4g, 2-4g(3)(a) and 2-4g(4). Potential costs are, however, staggering, considering that these hand receipts are sometimes forty pages long and printed in thousands of copies.

(c) Using a high quality microfiche-to-paper duplicator/copier is the best approach, provided that investment costs can be offset by other uses (other reproducible forms and/or all DA

forms).

(7) The requirements and guidelines for preparation of paper copies from microfiche, whether copies or masters, have been described!

(a) Viewer-printers should be used for making occasional prints; their acquisition and use must be controlled.

(b) High quality microfiche to paper duplicators/copiers appear to have a place in a micropublishing environment. However, these have not been tested or proven more cost effective than methods now employed.

(c) Introduction of devices capable of easily reproducing whole documents from microfiche threatens the savings micropublishing offers, unless appropriate controls are established and enforced.

h. TASK -- Determine and identify ongoing or projected printing projects or programs conducted or sponsored by major commands and similar activities that might preclude the effective conversion and implementation of Army publications in microform.

Major commands and staff activity response to a project questionnaire indicated no ongoing or projected projects which would preclude or significantly affect conversion of DA publications to microfiche.

2-5 PUBLICATIONS DISTRIBUTION.

a. The six tasks in this category deal with microfiche publications distribution from the two Army publications distribution centers. It was first thought that distribution of microfiche from the centers might be difficult; however, since visits to the centers, discussions with the staff, and simple tests performed using dummy sets of microfiche, show that such microfiche distribution can be made from the center, if proper care is taken.

b. TASK -- Determine the extent to which the current distribution system, policy, and procedures can be used for the distribution of microfiche and develop any necessary modifications.

(1) Simply stated, no modifications are necessary.

(2) As the volume of micropublication increases, some minor adjustments will be made to the distribution system. These are covered by other tasks in this group. None will be needed during the early stages of implementation.

c. TASK -- Compare the cost for the distribution of microfiche versus the distribution of hardcopy, considering, handling, packaging, addressing, mailing, storage and

re-warehousing.

(1) Two publications, DA Pamphlets 310-1 (140 pages) and 310-4 (650 pages), have been selected to illustrate typical distribution costs. Hardcopy costs were taken from Baltimore Publications Center files, are current as of October 1978, and cover most recent distribution cycles. In both cases, all copies printed were exhausted during the publication cycle. These two publications were selected because they are scheduled for early conversion to microfiche. February 1979 issue of DA PAM 310-4 was produced in microfiche, but not for distribution, as a first step in micropublishing the indexes. April 1979 issue of DA Pam 310-4 was produced and distributed in microfiche only.

(2) Costs start accumulating as publications arrive at the Baltimore Publication Center. Both paper and microfiche publications are delivered bulk in cartons. Microfiche publications are pre-packed in mailing envelopes, pre-printed with return address, mailing indicia, and publication number and date.

(3) Both paper or fiche handling costs include inventory, inspection, movement to initial distribution holding area (Initial distribution cannot begin until sufficient quantities of publication are on hand. Partial receipt of publication is the norm.), initial distribution, movement of resupply stock to storage area, picking to fill resupply requests and handling during resupply distribution process.

(4) Materiel costs include packing (envelopes, bags, boxes, shrink wrap and labels) prior to mailing.

(5) Mailing costs cover postage or freight charges for initial distribution of paper copies. Initial distribution of fiche would be via USPS. Resupply, except in unusual cases, is made for both paper or fiche publications via USPS.

(6) Comparative distribution costs for hardcopy and microfiche at Figure 2-5, Page 48 are for the most part self-explanatory. The number of copies printed of each publication is listed, as is the number of copies distributed under initial distribution and resupply. All paper publications were distributed by lowest cost method (freight, fourth class, fifth zone, book mail rate and third class mail). Microfiche are mailed third class bulk (initial distribution) and first class (resupply). It is important to note that costs increase significantly (as much as 10-1) during resupply.

(7) Total distribution costs for DA PAM 310-1:

(a) Paper	\$83,637.25
(b) Microfiche	\$13,763.26

(8) Total distribution costs for DA PAM 310-4:

COMPARATIVE DISTRIBUTION COSTS FOR HARDCOPY, MICROFICHE

DA PAM 310-1					
COPIES PRINTED	108,500				
INITIAL DISTRIBUTION	51,804				
	HANDLING	MATERIEL	MAILING	STORAGE	
HARDCOPY	\$812.00	\$312.00	\$ 9,135.00	\$ 0.00	
MICROFICHE	77.00	153.00	4,386.00	0.00	
RESUPPLY 56,896					
HARDCOPY	\$6,003.00	\$2,844.00	\$52,325.00	\$12,206.25	
MICROFICHE	551.25	21.88	8,531.00	48.13	
DA PAM 310-4					
COPIES PRINTED	61,800				
INITIAL DISTRIBUTION	38,712				
	HANDLING	MATERIEL	MAILING	STORAGE	
HARDCOPY	\$1,120.00	\$1,080.00	\$30,195.00	\$ 0.00	
MICROFICHE	112.00	10.00	3,251.00	0.00	
RESUPPLY 23,088					
HARDCOPY	\$2,408.00	\$1,144.00	\$26,392.00	\$11,160.00	
MICROFICHE	224.00	20.00	3,440.00	44.00	

FIGURE 2-5

- (a) Paper \$73,499.00
- (b) Microfiche \$ 7,213.00

d. TASK -- Determine if stock-on-hand procedures are necessary for microfiche publications assuming that duplication is accomplished by current high-speed duplicators.

(1) During initial implementation of micropublishing very little change to the distribution system will be required/initiated. Currently, print runs for paper include copies for stock/resupply. Elimination of stock on hand for microfiche publications would require the establishment of a demand printing system in the publications centers. In-house demand printing for resupply of a publication would exceed the 250 copy limit set by Joint Committee on Printing (JCP), thus requiring special approval/authorization.

(2) Sufficient justification (savings) cannot be immediately identified. JCP approval of capital equipment investment necessary to establish an in-house demand microfiche printing facility is, for this reason, unlikely.

(3) Current stock on hand procedures are the best for both paper and microfiche for the immediate future.

e. TASK -- Examine the advantages and disadvantages of having all duplicate microfiche prepared at the distribution centers.

(1) Publication printing, both paper and microfiche is now secured through the GPO. Joint Committee on Printing (JCP) approval is required for any change in this procedure. The cost of establishing a micro-reproduction facility at the distribution centers, as would be required to produce duplicate microfiche, could not be justified to the JCP, considering the ready availability of quality duplicate microfiche at reasonable prices from commercial sources. A procurement specification for duplicate microfiche has been drawn up that will meet Department of the Army micro-reproduction needs. (See Appendix B.)

(2) While advantages cannot be foreseen in the near or far term for all duplication of micropublished products at the centers there is a possibility that some time after implementation a change to the current publication system might be in order. Currently, publications are printed in sufficient quantities for initial distribution and resupply stock. Stock and management of publications for resupply purposes is a costly and wasteful expense that can be eliminated for publications in microform. Demand printing at the centers could be justified for resupply on an economic basis. This demand system would eliminate all stock and warehousing functions for micropublished products.

(3) Micropublished documents need not be stocked for

resupply. These can be duplicated and distributed in response to individual account holder requests. An on-demand resupply system approach follows, with discussion of the system's ADP requirements.

(4) The envisioned system might operate this way:

(a) An order is delivered to an input station by telephone or electronic means.

(b) If order is received via telephone, operator enters into their console, publication account number, publication number(s) ordered, and quantity.

(c) ADP system obtains account holder's address via account number, location of printing master(s), publication title. Printing masters are stored in automated retrieval fiche file drawers, four drawers per work station.

(d) For each publication ordered, the ADP system prints out the three information items previously obtained, along with quantity requested, on a line printer loaded with microfiche mailing envelopes.

(e) Work station employee checks the line-printer for orders; removes mailer(s); retrieves appropriate printing master(s); duplicates the quantity required, stuffs duplicates into mailer and dispatches; refiles masters; checks line-printer for new orders.

(5) The ADP system might consist of an input station(s), central processing unit (CPU) with disk storage devices, and line printer(s). A video display terminal, e.g., DEC RT 11, could serve as the input station in most cases. However, an appropriate interface should be provided, if orders are to be received by electronic means. Since the CPU does not perform extensive computational operations, a microprocessor such as an IMSAI 8080 with DOS should be sufficient. A simple line printer with tractor feed might serve as the output device(s).

(6) The system's ADP requirements are as follows:

(a) Four video display terminals providing order form display to be filled in or order taking interrogation routine with error-checking built into software.

(b) CPU (Minimal specifications equal to INTEL 8080-A) capable of supporting timesharing, data base management system to handle three large files; system response should be quick and compatible with telephone order taking operation.

(c) Disk storage for approximately 750 data types, with an average access time of 100 millisecond.

(d) Serial printer with tractor feed (30 CPS).

(e) Software to support the operation described in 2b, c, d; single and multiple order situations.

f. TASK -- What equipment, construction, and modifications will be required by the publications distribution centers to accomplish microfiche receipt, distribution, storage and duplication? What are the alternative costs and benefits involved?

(1) Based on the findings for other tasks within this group, no new equipment, construction or modifications will be necessary during the first year of micropublishing implementation.

(2) There is no basis on which an in-house duplication facility at the centers or elsewhere could be justified.

(3) There are no benefits to be derived from an in-house duplication system.

(4) The investment and operating costs associated with in-house duplication at the centers would be prohibitive.

2-6 PUBLICATIONS CONVERSION.

a. The tasks in this group - seven - describe: Army publication account holders, the number of new or revised publications per year, preparation processes now in use and how these might change with micropublishing, and publications now in microfiche. Also covered is creation of a publication profile, and development of decision process for selecting or rejecting a publication for micropublishing. Data to satisfy these tasks were collected through research, interviews and field survey by Publications Directorate personnel. Findings were put together by the study staff.

b. TASK -- For each of the major duplication categories (e.g., administrative, doctrinal/training, and technical), determine the number of publications accounts in each of the following groups:

- o. Active Army.
- o. CONUS.
- o. OCONUS.
- o. National Guard.
- o. Army Reserve.

The two Publication Distribution centers data processing resources were to be used to develop this data. However, data development would have required significant reprogramming to obtain CONUS, OCONUS data, and so it was decided to substitute

numbers of index subscription accounts corresponding to major functional areas. The figures at Table 2-6, Page 53, provide reasonable estimates of the number of account holders in each functional area.

c. TASK -- For each proponent indicate by category (e.g., TM, TB, PAM, AR) the number of new or revised publications and changes issued annually, and summarize the data.

(1) For purposes of clarity the task was rewritten as follows:

Compile numbers of new and revised publications and changes, by category, issued annually by each DA publications proponent.

(2) Using publication distribution centers capabilities, lists were compiled of the numbers of new and revised publications in each category (TM, FM, AR, ect.) issued during 1975 and 1976 by all proponents.

(a) Administrative publications are grouped by proponent in Table 2-7, Page 54.

(b) Doctrinal and training publications are grouped by proponent in Table 2-8, Page 55.

(c) Technical publications are grouped by proponent in Table 2-9, Page 56.

d. TASK -- For each proponent describe the typical processes used in manuscript preparation and identify the kinds of devices used to prepare manuscripts (e.g., MTST, Magnetic Cards, Selectric typewriters, word processing equipment using floppy disks, etc) and summarize the data by equipment, by type.

(1) Again, for purposes of clarity, the task was rewritten:

Collect data reflecting processes used by each proponent to prepare DA publication manuscripts. Catalog devices used.

(2) Data collected from publications proponents covering 1975 and 1976 indicate that:

(a) Fifty-four percent (54%) of all pages are provided in typewritten draft.

(b) Eighteen percent (18%) of pages are provided in camera ready form.

(c) Eighteen percent (18%) of pages are available in magnetic media.

(d) Standard and automatic typewriters are the chief devices

NUMBER OF ACCOUNT HOLDERS BY FUNCTIONAL CATEGORY

	<u>ADMINISTRATIVE*</u>	<u>TECHNICAL*</u>	<u>DOCTRINAL*</u>	<u>TOTAL</u>
ACTIVE ARMY	6,690	6,269	6,328	19,287
ARMY RESERVE	1,919	1,905	1,914	5,738
NATIONAL GUARD	1,643	1,631	1,631	4,905
CONUS				19,802
OCONUS				5,654

*CATEGORIES OVERLAP. FIGURES ARE FOR 1977

FIGURE 2-6

NEW OR REVISED ADMINISTRATIVE PUBLICATIONS

1975 and 1976

<u>PROPONENT</u>	<u>REGS</u>	<u>PAMS</u>	<u>CIRS</u>	<u>JCS</u>	<u>PUBS</u>	<u>DA</u>	<u>POSTERS</u>	<u>DOD</u>	<u>PUBS</u>	<u>MISC</u>	<u>PUBS</u>
ACSI	19	2	1						1		
ACDI									1		
CAR	9	1									
CCH	2	9									
CIDC	1										
CMH	1		1								
COA	20	6							5		
COE	28	2	4				1				
CDC							1				
CSA	17	6									
DAMO		1									
DARCOM	37	12	2				22		14		
DCSLOG	41	4	8				1		4		
DCSOP	42	25	2								
DCSPER	27	4	3				3				
DCSRDA	17	1	2								
HSC	1										
USAI&L										1	
JCS					16						
MDW	2										
MILPERCEN	22	9	25						1		
MTMC	5								2		
OASA	1		1								
OASA(I&L)			2								
OCE	1										
OCPA	2	11	4								
OSA	5	1	5								
OSD		1								2	
TAG	5	26	1								
TAGCEN	56	16	48								
TIG	7		2								
TJAG	5	16									
TRADOC		1	1								
TSG	33	3	6								
USAAC	8										
USACC		1									
USALMC		1									
USASA							1				
VA										1	

TOTAL ADMINISTRATIVE PUBLICATIONS - 768

FIGURE 2-7

NEW OR REVISED DOCTRINAL PUBLICATIONS

1975 and 1976

PROPONENT	FMs	TCs	TOEs	ARTEPs	FIRING TABLES	JTAs	CTAs	SUBJECT SCHEDULES	TRADOC BULLETINS
AHS	5	3							
AHSUSA	1	1							
DAMO(DCSOPS)	1								
DARCOM	9				1		1		
DARCOM BRL					4				
DASG	1	1							
DCSLOG	1					10			
DCSOPS							5		
INSCOM	7	3							
JMPTC	1								
LOGCEN	1								
MTMCTEA	3								
MTMTS	2								
OPNAVINST						1			
TRADOC	38	36	129	12	12		1		9
TJAG								2	
TJAGSA								1	
USAAC	1								
USAAD	11	2						1	
USAArms		11		1					
USAACS	1								
USAAVNC		1							
USAAVNC&S		2							
USAAVNS	7	1		1					
USABRL					3				
USACAC		1							
USACATB		2							
USACC	1								
USACGSC	3								
USACHS		1							
USAES	5	2							
USAFAS	2	8							
USAIC	1								
USAICS		1							
USAIMA		2							
USAIS	4	6		1					
USALMC	2								
USALOGC	7								
USALOGCEN	1								
USAMPS	16	2		1					
USAOCS	11			1					
USAMMCS		4							
USAQMS	34	8		2				1	
USASIGS	1	6		1					
USATSCH	7	1		1					

TOTAL DOCTRINAL PUBLICATIONS - 492

FIGURE 2-8

NEW OR REVISED TECHNICAL PUBLICATIONS

1975 and 1976

<u>PROPONENT</u>	<u>TECHNICAL MANUALS</u>	<u>TECHNICAL BULLETINS</u>	<u>SUPPLY BULLETINS</u>	<u>LUBRICATION ORDERS</u>
AIIC	1			
ARCOM	1			
ARRADCOM	31	13		
ARRCOM	61	14	3	
AVRADCOM	95	16	1	
CERCOM	312	173	4	
CSL	27	1		3
DACA		1		
DARCOM		2	30	
DCSLOG	4		2	
DSA			2	
Frankford	13	2		
FSTC				1
ISCOM	56			
JMPTC	2			
MIRCOM	268	174	10	5
MTMC	3			
MTMCTEA	10	1		
OCE	9	3		
TARCOM	90	21	1	14
TIG	1	1		
TSARCOM	101	21	4	72
TSG	1	16	1	
USACC	2	1		
USACSC	2			
USADCA	2			
USAIIC	5			
USALC	2		6	
USAMMA			4	
USAOC&S	1			
USASA	5	3		
USATSCH			6	
TOTAL TECHNICAL PUBLICATIONS - 2073				

FIGURE 2-9

used in the manuscript preparation process.

(3) Detailed description of numbers of pages prepared, and form these were submitted in by proponents is shown in Table 2-10, Page 58.

(4) Detailed description of type devices used in preparation processes by proponents is listed in Table 2-11, Page 59.

e. TASK -- Determine the extent to which manuscript preparation processes would have to be modified by proponent to expedite micropublishing.

(1) Army publications manuscript preparation processes currently span the entire range of print preparation approaches. Some of the techniques or approaches now in use should be changed whether publications are selected for micropublication or not. Some examples are:

(a) Typefaces should be chosen for their functional value (readability), not aesthetic characteristics.

(b) Type faces should not be chosen for economic reasons alone, (i.e., small point sizes, tight character spacing), since readability and comprehension are most important.

(2) Micropublishing can be accomplished by one of two methods: by source document microfilming using camera ready copy or by computer output microfilming using magnetic tape. By either method, the information must be composed prior to creation of microfiche, as it must for printing paper. Thus, manuscript preparation processes employed by proponents need not be modified for micropublishing. Proponents should consider automating the creation, revision, maintenance and management of manuscript information; products should be transmitted in magnetic form for edit markup and composition. Such automation would speed up/alleviate problems in either form of publication.

(3) Electronic preparation and manipulation of manuscript information is covered in Chapter 4.

f. TASK -- Determine which proponents currently issue Department of Army publications on microforms, to whom, and by what distribution method.

(1) At present, only a limited number of Army publications are produced in microfiche. Nevertheless, Army publications in microfiche cause the creation of over 2.5 million new microfiche each month. Most of these publications are logistics type with DCSLOG as the proponent.

(2) During the course of the study three Army publications, TB 55-45, DA PAM 18-1-1 and DA PAM 310-4, were produced and distributed in microform.

NUMBERS OF PUBLICATION PAGES AND SUBMISSION FORM

<u>PROPONENT</u>	<u>DOUBLE SPACED TYPEWRITTEN MANUSCRIPTS</u>	<u>CUT AND PASTE</u>	<u>CAMERA- READY</u>	<u>MAGNETIC MEDIA</u>	<u>PLATE READY FILM REQ</u>	<u>TOTAL</u>
DAAG	2,565	1,100				3,665
DAAR	244					244
DACA	2,060	1,900	1,000			4,960
DACH	13		10			23
DACS	532,996	2,835			275	536,106
DAIG	307	384	32			723
DAJA	11,251	595	74			11,920
DALO	2,905	200	220			3,325
DAMH	2,100		200			2,300
DAMI	1,556	57				1,613
DAPC	50,000	100,000	6,200		10,000	166,200
NGB	1,027	164	1,953			3,144
DAPE	2,300	3,400				5,700
DASG	9,602	3,325	24,209		1,246	38,382
DARCOM	149,294	83	112,764	275,000	15,010	552,151
COM CMD	4,516	7	33,794			38,317
MTMC	1,491	2,672	1,684			5,847
HSC	1,446	189	17,067			18,702
TRADOC	6,240		97,809		968	105,017
TOTALS	781,913	116,911	297,016	275,000	27,499	1,498,339
PERCENTAGE	52.13	7.80	19.82	18.35	1.85	100%

FIGURE 2-10

DEVICES USED IN PREPARATION OF DA PUBLICATIONS MANUSCRIPTS

AUTOMATIC TYPEWRITERS/WP DEVICES

PROONENTS	MAGNETIC CARD	MAGNETIC TAPE	MAGNETIC DISC	STANDARD ELECTRIC TYPEWRITER*	STANDARD TYPEWRITER**	PHOTO- TYPESETTER/ TAPE ACTIVATED	PHOTO- TYPESETTER/ DIRECT ENTRY (KEYBOARD)	OCR	ADP COMPUTER GENERATED OUTPUT
DAAG	X	X	X	X					
DAAR		X		X	X				
DACA				X					
DACH		X							
DACS	X	X	X	X	X		X		X
DAIG		X		X	X				
DAJA	X	X		X	X				X
DALO		X	X	X	X				
DAMH			X						
DAMI		X							
DAPC		X		X	X	X		X	
NGB	X			X	X				X
DAPE		X		X	X				
DASG		X	X	X	X				X
DARCOM	X	X	X	X	X	X			
COM CMD	X	X		X	X				
MTMC				X	X				X
HSC		X	X	X				X	
TRADOC									X

* CHANGEABLE TYPE FONTS

** FIXED TYPE

FIGURE 2-11

(3) Table 2-12, Page 61, lists Army publications now in microfiche.

g. TASK -- Obtain data elements in order to develop the criteria for determining the order in which suitable publications are to be converted.

(1) As a first step in developing criteria, a publication profile coding system was designed. This profile incorporates various publications characteristics, e.g., color, illustrations, forms, fold-outs, tables, graphs, small type, half-tones, computer printout, typeset copy, typewritten copy and line art. The publication profile code is at Figure 2-13, Page 62.

(2) As a second step in criteria development, publications were screened and coded by type of publication. Results are at Table 2-14, Page 63.

(3) As a final step in this data collection effort, a table showing publication types and numbers in each, with a breakdown by profile codes was prepared. This Table 2-15, is located on Page 64.

(4) The publication profile coding system was designed to depict, in descending order, the increasing difficulty encountered in preparing publications for microfiche or paper. Any publication in category 1, 2, or 3, particularly those in category 1a, 2a, and 3c would be relatively easy to prepare. A review of the publications screening results shows that large quantities of publications, over eight thousand, fall into these categories. Six publications types lie entirely within them.

(5) Information derived from this task provides only one element to be considered when deciding which publications to micropublish first. Viewer availability, environment to be used in, proponent desire, and economics are other important considerations.

h. TASK -- Obtain data elements in order to develop the criteria for determining which publications should, and which should not, be converted to microfiche.

(1) The data elements for developing criteria necessary to determine which publications should be micropublished have been collected in other tasks or gathered through experience with products now micropublished. So, this task has been rewritten as follows:

- o Develop criteria for determining the order of precedence in which publications should be micropublished.

(2) Criteria development is not difficult if attention is focused on the primary purpose of publications: the dissemination of useful information in usable form.

DA PUBLICATIONS NOW IN MICROFICHE

<u>PROPONENT</u>	<u>PUBLICATION</u>	<u>FROM</u>	
CSC	DA Pamphlet 18-1-1	Computer Systems Cmd	Special Distr List
DARCOM	Army Retrieval Micro- form System (ARMS)	New Cumberland AD	Special Distr List
	DA Circular 700-27	USAAGPC, Baltimore	Div/Installation
	DA Pamphlet 700-21	USAAGPC, Baltimore	Special Distr List
	Supply Bulletin 700-2	USAAGPC, St. Louis	12-34 Acct Holders
	700-20	" "	" " "
	700-21	" "	" " "
	700-24	" "	" " "
	700-25	" "	12-21 Acct Holders
	700-30	" "	" " "
	708-3	Printer (ID)	12-34 Acct Holders
	708-21	" "	" " "
	710-1-1	" "	Special Distr List
ATMC	Technical Bulletin 55-45	Printer (ID)	12-34 Acct Holders
	55-46-2	" "	" " "

FIGURE 2-12

PUBLICATIONS PROFILE CODE

1. NO Color
Illustrations
Forms, Foldouts
Tables
Graphs
Typesize below 8 point

A. Over 50% computer printout,
balance typewritten
B. Computer printout, typeset copy
C. Typewritten Copy
D. Typeset
2. NO Color
Illustrations
Forms, Foldouts
Tables
Graphs

A. Over 50% Computer printout,
balance typewritten
B. Computer Printout and typeset
copy
C. Typewritten copy
D. Typeset
3. NO Color
Halftone illustrations
Forms, Foldouts

A. Typeset copy
B. Typewritten copy
C. Over 50% computer printout
balance typewritten
4. NO Color
Halftone illustrations
Forms

A. Typeset with horizontal
foldouts
B. Typeset with vertical foldouts
C. Typeset with horizontal/vertical
foldouts
D. Typeset copy
E. Typewritten copy
5. NO Color
Halftone Illustrations

A. Typeset with Horizontal foldouts
B. Typeset with vertical foldouts
C. Typeset with horizontal/vertical
foldouts
D. Typeset copy
E. Typewritten copy only
6. NO Color

A. Typeset with page size
illustrations
B. Typeset with oversize horizontal
line and/or halftones
C. Typeset with oversize vertical
line and/or halftones
D. Typeset copy only
E. Typewritten copy only
7. Two Color

A. Line illustrations
B. Halftones
C. Typeset Titles
D. Combination of line, halftone
illustrations or typeset titles
E. Typewritten copy only
8. Multi-color
9. Other

FIGURE 2-13

PUBLICATIONS BY TYPE AND PROFILE CODE

	#1		#2		#3		#4		#5		#6					#7			#8	#9	1-25		26-100		100+		AVG #
	A	B	D	B	D	A	B	C	A	C	D	E	A	B	C	D	E	A	D	E	Pgs	Pgs	Pgs	Pgs	Pgs	Pgs	
AR	28					35	4		5		19	1	1					3		55	35	10	48				
CIR	54					26			8											95	5		13				
PAM	20					43			8		6									30	34	36	107				
FI						42	12		9		29	7					6			3	39	58	151				
TC	6					4	7		7		22			3	19	22	4	6		13	53	24	53				
ROTCM									40		40	20										100	317				
ATP						98													35				12				
ASUBJ						99													74				17				
SCD																											
JTA						95													100				13				
ATT						96													85				26				
ARTEP						36	45	14	5													99	201				
TOE	19							81											13		84	2	94				
CTA	60					40													50		50		29				
TRADOC						1											1		50		50		28				
FT						28		3						3	62				54		15	31	9				
TB	13					47			5		5	20							83		11	6	37				
SM											64		31						86				307				
SB	2					3	7				32	55		5					73		19	8	33				
LD									92		7	2						100					2				
TM	1/2	9	1			12	1/2		1	1/2	1	5	1	44	19	4			21		40	39	207				

Figures are percentages except column titled Average # pages; less than 1/2 of 1% not recorded.
Use this chart with Figure 2-13, Publication Profile Code.

FIGURE 2-14

PUBLICATIONS MAKEUP BY CATEGORIES

<u>AR</u> - 1435	<u>TB</u> - 2780	<u>TM</u> - 13020
1D - 172	1D - 361	1A - 39
3A - 517	3A - 1306	1B - 1172
5A - 78	5A - 139	2B - 130
5D - 273	5D - 139	3A - 1562
	6A - 556	3C - 39
<u>CIR</u> - 112		4D - 130
1D - 60	<u>LO</u> - 882	4E - 39
3A - 29	5B - 811	5A - 130
5D - 9	5D - 61	5C - 130
	6A - 9	5D - 651
		5E - 130
		6A - 5729
		6B - 2474
		6C - 521
<u>PAM</u> - 1000	<u>ARTEP</u> - 77	
1D - 200	3A - 27	
3A - 430	3B - 34	<u>SM</u> - 180
5D - 80	4A - 10	
6A - 60	4C - 3	6A - 115
		6D - 56
<u>FM</u> - 875	<u>TC</u> - 294	
3A - 367	1D - 17	<u>ATP</u> - 74
B - 105	2D - 11	3A - 72
5D - 78	3A - 20	
6A - 245	5D - 20	<u>ASUBJSCD</u> - 276
6B - 26	6A - 64	
8 - 43	6E - 8	3A - 275
	7A - 55	
<u>ROTCM</u> - 9	7D - 64	<u>JTA</u> - 45
	8 - 11	
5D - 4		3A - 43
6A - 4	<u>FT</u> - 136	
6B - 1		<u>ATT</u> - 65
	3A - 38	
<u>TOE</u> - 967	3C - 4	3A - 62
	7A - 4	
1A - 183	7E - 84	<u>SB</u> - 891
3B - 783		
	<u>TRADOC</u> - 10	1D - 17
<u>CTA</u> - 22		3A - 17
	3A - 5	3C - 60
1B - 13	8 - 5	5D - 277
3A - 8		6A - 477
		6E - 43

FIGURE 2-15

- o The first criterion is: The user must be able to use the information in microform.

(a) In order to use a microform, a viewing device must exist that meets the requirements of the user's environment.

- o The second criterion is: That viewing equipment must be made available to the user.

(b) Heretofore, most publications selected for micropublishing have had similar, favorable characteristics. These are: large number of pages, frequent revision, dynamic (active) information, and large number of users. Publications with these characteristics are most suitable for micropublishing. Micropublishing them guarantees great savings. Cost of new viewing equipment must, of course, be taken into account.

o The third criterion therefore is: The cost of all necessary viewing equipment must be absorbed by the savings accumulated through five years of micropublishing the product(s) generating the viewer requirement. If, however, micropublication will overcome/solve handling/distribution problems encountered with hardcopy publications and thus improve the Army's readiness posture, this criterion is less significant.

(c) Improving the readiness posture of the Army by solving a current information handling or dissemination problem is justification to override the third criterion.

CHAPTER 3

LABORATORY WORK

3-1 GENERAL.

a. This study, unlike IMPACT I, did not have as part of its charter any requirements to create or test micropublications. However, there were tasks within the project directive dealing with the development of a proposed implementation plan that required not only research but the performance of experiments and tests to arrive at logical conclusions. Additionally, one task required continued investigation and evaluation of both micropublishing and micro-republishing equipment and systems (commercial and government) as input to an expanded cost benefit analysis.

b. While this study was in progress several proponents requested assistance (technical and procedural) in developing or converting publications to micropublications. These opportunities were used to develop micropublishing techniques and perform tests the results of which could be applied to other publications during any formal implementation of micropublishing in the Army. The following sections of this Chapter are devoted to those areas investigated having greatest significance.

3-2 FORMAT AND INDEX CONSIDERATIONS.

a. One of the primary considerations involved in the conversion of any publication to microfiche is retention of information utility. The nature of micrographics (compaction of information) has a great potential for diminishing the usability of information. For that reason, care must be taken to build into a micropublication aids or enhancements which will act to replace those elements of user flexibility now found in a paper publication. This requirement is not limited to publications in microform but applies in degrees to all information in microform.

b. Realizing the existence of the diminishing utility phenomenon associated with conversion of information in paper form to microform, the IMPACT II study team undertook an experiment. As a test, FM 71-1 (The Tank and Mechanized Infantry Company Team) was converted to microform using source document microfilming techniques. The goal of this experiment was to create within the publication (in microform) those elements (aids) we felt were necessary to achieve user acceptability from a functional point of view.

c. The final product is a set of eight (8) microfiche. This set of microfiche depicts the application of indexing and

formatting techniques developed to aid the user. The significant characteristics are as follows:

(1) All images are in positive form (dark line, light background); this is a break with the traditional manner in which users are supplied working copy microfilm. Tests performed with negative appearing graphic images indicated a reduced perception of information presented except in cases where the user had a background in photography. Tests performed with negative and positive image frames readable without the use of a viewer were found to be more quickly intelligible in positive form than in negative form. Pages containing text only, whether in negative or positive form, posed no perception problems; however, they were preferred in negative form in a viewing device.

(2) The first fiche in the set provides, in eye readable form, information normally found on the cover of a publication such as: publication number, title, publication date, effective date, supersession notice and distribution information. Providing this information on what we call the Publication Cover Fiche is new only from the point of placing it on plastic instead of card stock which is current micropublishing practice. The object was, eliminate a task and thus lower overall costs. Collating sets of plastic is easier than collating plastic and card stock into sets and conventional printing is avoided. It is appropriate to mention that a cover fiche may not serve sufficient purpose to justify its cost. Example: adding a cover fiche to a microfiche publication consisting of only two fiche raises by 50% of the total micropublication printing cost. While the Publication Cover Fiche may be nothing more than window dressing to some, proponents and users alike appeared to be more receptive to a micropublication with a publication cover fiche. A facsimile of the FM 71-1 Publication Cover Fiche is at Figure 3-16 Page 68.

(3) Large publications (several hundred pages) requiring more than two microfiche can have their utility improved by placement of an eye readable Microfiche Table of Content following a Publication Cover Microfiche. FM 71-1 is over 400 pages, and contains eight chapters, eighteen appendices and a keyword index. By creating an eye readable microfiche table of content the user can, without resorting to the use of a microfiche viewer, determine which fiche contains the subject matter they desire to read. If only one chapter is placed on a microfiche, and the chapter number and title are placed in the microfiche header area, the value of the Microfiche Table of Content will be reduced; however, the user will be required to read each microfiche header to arrive at the desired fiche. Limited experience (three publications currently) using a microfiche table of content indicates user support for an eye

PUBLICATION COVER FICHE

★ FM 71-1
HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 30 JUNE 1977

**THE TANK AND MECHANIZED INFANTRY
COMPANY TEAM**

★ THIS PUBLICATION SUPERSEDES TC 17-15-1, 1 OCTOBER 1973;
TC 17-15-3, 15 APRIL 1975; TC 71-4-2, 10 OCTOBER 1974

FIGURE 3-16

readable table of content fiche even when content of individual fiche is placed in header area. A facsimile of the FM 71-1 Microfiche Table of Content is at Figure 3-17, Page 70.

(4) Of the eight fiche comprising the set, six are the actual publication. These six fiche have been indexed and formatted without regard to the existence of the publication cover and table of content fiche. See Figure 3-18, Page 71, for a facsimile of FM 71-1, Fiche #1. Characteristics of, and enhancements used to improve utility of publications in a microform are:

(a) At a minimum the top portion of each fiche (header area) contains the publication number, title, classification, publication date, fiche number and number of fiche in set, effective date of publication (if it has one). Should space permit the chapter numbers and subject are provided. All information (titling) in the header area is in a positive image without stripe backing.

(b) Frames readable without the use of a viewer are provided at the beginning of each significant section of the publication, and include the page (frame) location that starts that section.

(c) Each fiche has the complete publication table of content including the fiche table of content.

(d) The last eight frames of each fiche contain the keyword index.

(e) Chapters are not split across two fiche except when the chapter was longer than one fiche. In this situation, a logical break point was found.

(f) Publication page numbers were retained, and fiche and frame designations added.

(5) The fiche can be used as follows:

(a) Look at Fiche Table of Content, select chapter (assume Chapter 2 is selected). Go to fiche number 1 in publication set. Look at fiche, find Chapter 2 eye readable frame, note page (frame) number. Place fiche in viewer, use index grid on viewer to find frame B12, you are now looking at first frame of chapter 2. Using the above approach one can find the first frame (page) of any significant part of the publication, without placing fiche in viewer.

(b) Assume you are viewing part of fiche number two and desire to know something about nuclear, biological and chemical

EYE READABLE TABLE OF CONTENT

MICROFICHE TABLE OF CONTENTS

FIELD MANUAL NO. 71-1

THE TANK AND MECHANIZED INFANTRY COMPANY TEAM

MICROFICHE 1	-----	PREFACE
		CHAPTER 1 THE MODERN BATTLEFIELD: AN OVERVIEW
		CHAPTER 2 THE ENEMY IN MODERN BATTLE
		CHAPTER 3 PREPARING FOR COMBAT OPERATIONS
MICROFICHE 2	-----	CHAPTER 4 OFFENSE
MICROFICHE 3	-----	CHAPTER 5 DEFENSE
MICROFICHE 4	-----	CHAPTER 6 OPERATIONS SECURITY
		CHAPTER 7 COMBAT SUPPORT
		CHAPTER 8 COMBAT SERVICE SUPPORT
MICROFICHE 5 AND 6	-----	APPENDIX A THRU R
MICROFICHE 1 THRU 6	-----	KEYWORD INDEX FRAME G:7 THRU G-14

FIGURE 3-17

FICHE 1 - FM 71-1

FM 71-1

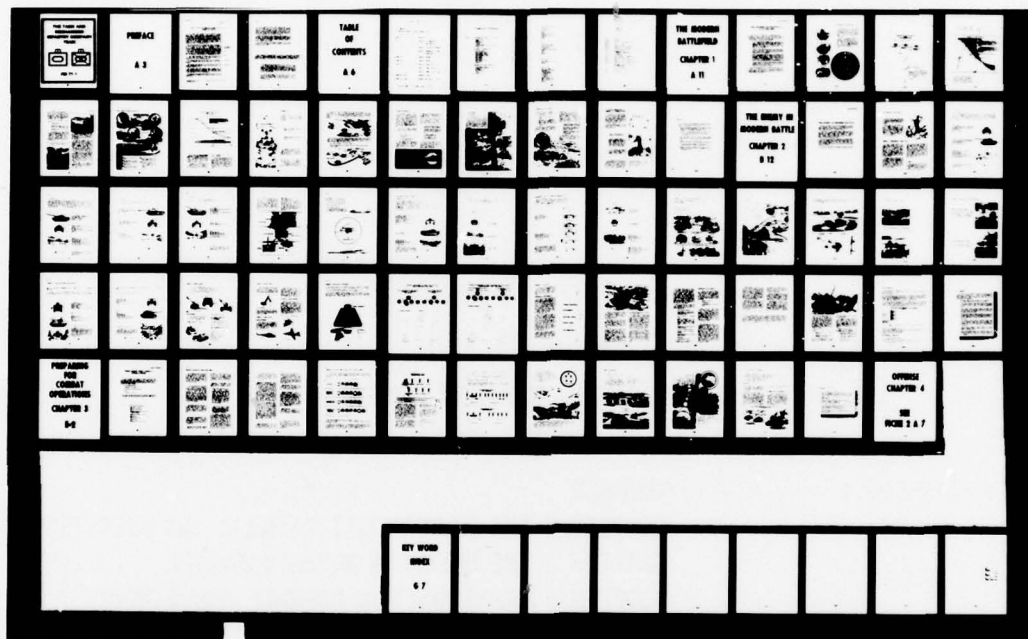
THE TANK AND MECHANIZED INFANTRY
COMPANY TEAM

1 OF 6

UNCLASSIFIED

CHAPTER 1, 2, 3

30 JUNE 1977



THIS PAGE IS BEST QUALITY FRAGMENT
REPRODUCED FROM THE ORIGINAL TO DDO

FIGURE 3-18

operations. Move the fiche carrier to view the top row of the fiche, find the table of content eye readable frame. Move to the fiche table of content, this provides no help except to point you to the Chapter Table of Contents. Chapter 1, fiche 1, frame B9 covers nuclear, biological and chemical operations. Additionally, a review of the appendix list reveals that Appendix II located on fiche 5, frame E11, also addresses the subject. These two references have been found using fiche number two because each fiche has the complete table of contents built into it. If the keyword index had been referred to, yet another reference to nuclear, biological and chemical operations would have been found, still using fiche number two, tables of contents normally are only found at the beginning of the publication and keyword indexes are only found at the end of a publication.

(6) The indexing experiment from a creator viewpoint was successful. The techniques depicted in the test set of fiche (FM 71-1) and described herein can be applied to any publication. Some variation may be desired to offset other areas of user reluctance to medium change. Over 1,000 sets of FM 71-1 in microfiche have been distributed for evaluation and comment. Only favorable comments have been received.

(7) Quality of the micropublication was not a goal associated with the format and indexing experiment. However, in the process of developing the final product, several iterations of the microfiche publication were necessary, these iterations provided opportunities to correct quality problems noticed. We feel that only a small quality degradation will be found between the published manual and the microfiche copy. To illustrate this point, the following information is provided:

(a) Camera ready paper (1st generation) copy was used to make a printing plate.

(b) Printing plate (2nd generation) was used to print paper field manual.

(c) We ran paper field manual (3rd generation) through a copying machine to wash out gray and brown screening and produce a high contrast paper copy for microfilming.

(d) Our paper copy (4th generation) was microfilmed to provided original negative.

(e) Original negative (5th generation) was copied to make a positive printing master.

(f) The printing master (6th generation) was used to produce distribution copies of field manual in microfiche.

(g) From the distribution copy (7th generation) a paper copy was generated from microfiche to test legibility.

(h) The paper copy (8th generation) was used as camera ready for Figure 3-18, Page 74.

(i) Figure 3-19 is at least a 9th generation copy.

3-3 MANUAL (PAPER TO MICROFILM) MICROPUBLISHING.

a. During the course of the study there were two occasions which arose that dictated the use of a paper document to effect micropublishing of a product. The first case involved development of a micrographic system that would support the publishing of Army standard computing systems documentation in microform. The other application had to do with a joint Army and Air Force publication containing true copies of letters of certification.

(1) The United States Army Computer Systems Command (USACSC) is responsible for maintaining, updating, publishing and distributing standard systems documentation for the eighteen (18) standard Army computing systems. Each set of standard system documentation consists of six volumes, Volume 3, Operations and Scheduling, is the largest (high as 2,500 pages) and accounts for greatest number of changes per quarter (400 pages). Most Army publications are published using graphic art quality fonts with point sizes ranging from 4 point to 36 point type. Standard computer systems documentation is one of the exceptions where a publication is typewriter set. This approach to publication preparation is necessitated by the short turnaround time between finalization of information and implementation of the change in the computer system. Volume 3 of the standard system documentation is not limited to text alone, there are several hundred pages of flow charts also. This precluded our first thought for implementation which was to automate the publications. Automation was put off for the following reasons:

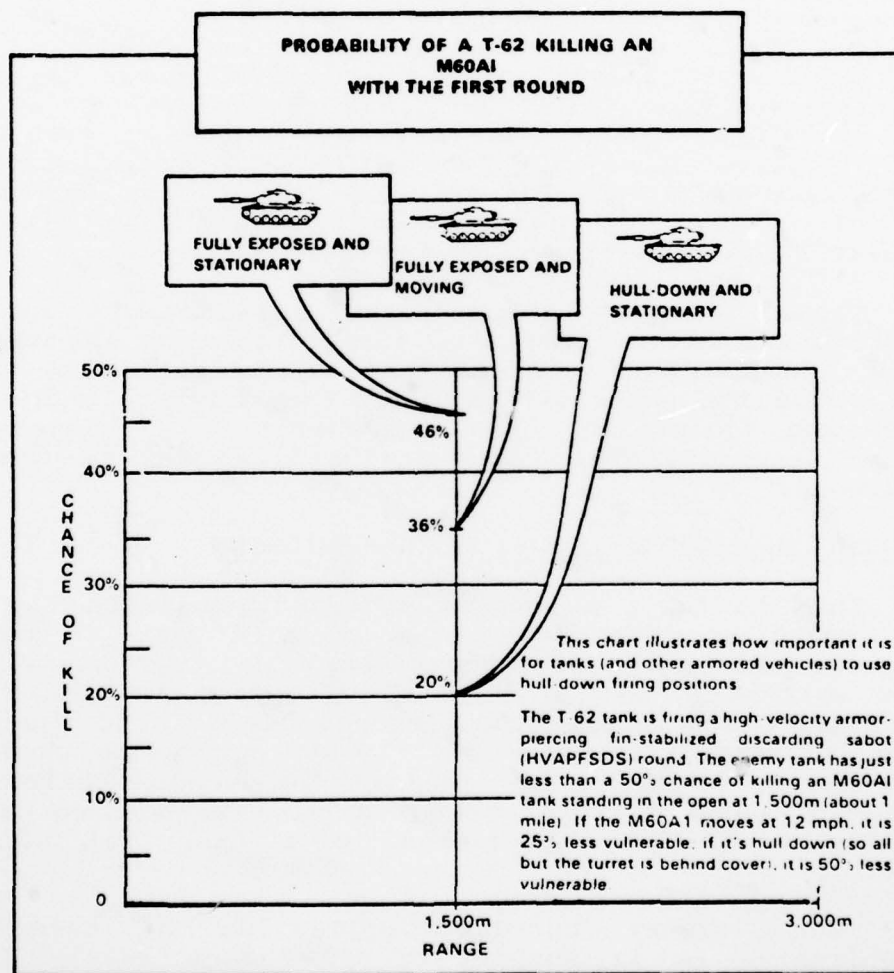
(a) Development time would have slowed implementation.

(b) It had not been determined if in fact, users of the documentation could use it in microform.

(c) Manual micropublishing afforded early implementation that would generate large savings that might later be used to justify investment in an automated system.

(d) Paper copy of the system documentation had to be prepared to test the system change, and could be used as camera copy.

The accuracy of modern weapons is very great. Tank guns are so accurate that they will usually get first-round hits. Their ammunition destroys both hard and soft targets.



A13

I-3

FIGURE 3-19

(e) Indexing and formatting approaches currently under development could easily be applied in a manual micropublishing application.

(f) Economic analysis of first publication (STANFINS Vol 3) indicated 1.4 million savings over paper publishing using manual micropublishing.

(2) The Military Transport Management Command (MTMC) has responsibility for movement of Army equipment and supplies. This responsibility requires preparation of publications dealing with the packing and movement of equipment and supplies under all possible situations. TB 55-45/AFP 76-19, Certification of Military Equipment for Transport in Air Force Aircraft is the first Army publication created and produced in microfiche only. The publication is unique in that the first three microfiche of the publication are automated allowing production via computer output microform, while the last microfiche is created via a manual microfilm process. Two types of microform creation are required because a portion of the publication contains true copies of letters of certification authorizing transport of particular items of equipment in certain aircraft.

b. Manual micropublishing is not a recommended approach for micropublishing in the Army when the information is available in magnetic form or when the publication can easily be automated. However, when the paper camera ready copy must be made for other purposes and acceptable fonts (sans serifs) with lower case "e" character heights above 1.35mm are used, it may be economically advantageous.

3-4 BUSINESS COMPUTER OUTPUT MICROPUBLISHING.

a. This is fully automated micropublishing in its simplest form. There is undoubtedly more of this type micropublishing being performed in the government than all other kinds combined. For the most part, it is found to be upper case characters and numerics 132 characters to the line and 64 lines to the page with an index automatically generated. Page packing per microfiche is 270, or 420 if 80 character lines are produced. While the final product is usually upper case only, there does exist the capability to produce upper and lower case and some common symbols.

(1) The largest current application of this type of micropublishing is in support of government supply functions. Largest single product is the Federal Supply Catalogs with 84 million distribution fiche per year, followed by the Army's Logistics Catalogs, Supply Bulletins, some Technical Bulletins and Department of Army Pamphlets.

(2) Our most recent micropublication DA PAM 18-1-1, Army Inventory of Data Systems, is produced using this simple micropublishing approach. Computer output micropublishing makes it possible to generate eight separate indices for this 10,000 page publication. Additionally, the publication can be prepared quarterly instead of bi-annually. Savings using microfiche as an alternative to paper are projected at over \$70,000 per issue.

b. In those cases where no real requirement clearly exists for graphic art quality characters and variable point sizes, a publication can easily be automated and micropublished using this approach. This form of automated micropublishing is the lowest cost and generates the greatest savings per copy produced.

3-5 BUSINESS COMPUTER OUTPUT MICROPUBLISHING WITH SIMPLE LINE ART.

a. There are within the Army some 967 plus Tables of Organization and Equipment (TOE). These publications are changed, revised and published on an average of once each year and approximately 1,300 copies are produced. The publication makeup is as follows:

(1) Section 1, consists of introduction type information and an organization chart, five page average.

(2) Section 2, consists of number and kinds of personnel authorized. Seven page average.

(3) Section 3, consists of number and kinds of equipment authorized. Ten page average.

b. Several years ago the Section 2 and 3 portions of the TOE's were automated. Following the automation computer output microfiche were generated for testing TOE use in microfiche. Tests showed that TOE publications could be used in microfiche, however, implementation of the TOE's in microfiche could not take place because Section 1 had not been automated.

c. Problem: How do you micropublish the TOE's, considering a piece of line art must be included in each TOE. The following approaches were considered:

(1) Manually micropublish the Section I's and produce the other sections as computer output microform. Rejected, split publication not acceptable.

(2) Delete the organization chart and automate Section 1 to enable production of computer output microfilm. Rejected, does not solve problem, requires change to facilitate micropublishing.

(3) Manually micropublish the whole TOE. Rejected, Section II and III computer generated on 14"x17" paper double spaced and sent to printer to photo-reduce to 8"x10.5" camera copy. The net result was 44 lines of 6 point type per page, all in upper case.

(4) Produce computer output microform TOE's using graphic merge techniques. Possible, however requires costly labor and material for preparation.

(5) Don't micropublish TOE's. Rejected, potential annual savings of \$142,000 for printing are too great. Cost of preprinted forms, computer time and distribution are yet to be determined.

(6) Simulate the organization charts with some character or symbol. Rejected, proponent desire is for organization charts created with horizontal and vertical lines.

d. Solution: Using a 3M Linolex Word Processor we stroked all information contained in the Section 1 of a TOE. See Figure 3-20 and 3-21, Pages 78 and 79, original copy of first two pages of TOE. The organization chart was constructed by using symbols not found in a TOE, but present on the word processing keyboard. See Figure 3--2 and 3-23, Pages 80 and 81, Linolex hardcopy output. Next, we created a magnetic tape copy of the floppy disk, this would be the input to the Datagraphix Mini-AutoCOM we planned to use. Using the translate table capabilities of the COM device, we set up the table of equivalences shown in Figure 3-24, Page 82, and ran the tape.

(1) Output tape from Linolex was something other than 133 character print lines.

(2) Word processor features such as line centering was not carried over to magnetic tape from a floppy disk.

(3) Several typing errors had been made during construction of the organization chart. In part, we feel that errors would have been reduced if a 132 character CRT display had been available to construct the organization chart.

e. Corrections for problems: The major problem was solved when we were made aware of a software routine in the hands of Library of Congress Linolex operators. This software converts Linolex floppy disk data to 133 character print lines when writing on tape through a communications device. A subsequent run on the COM after generating a tape via the Library of Congress Linolex system (ours doesn't have communications) proved that all data lines, even those generated with centering command were properly converted and placed. After making typing

TABLE OF ORGANIZATION)
AND EQUIPMENT)
NUMBER 3-97H)

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C., 29 December 1972

GENERAL CHEMICAL LABORATORY

Designation: _____ Chemical Laboratory (General)

Section		Page
I. General:		
	Organization -----	1
	Equipment -----	4
II. Personnel Allowances:		
	Distribution -----	8
	Recapitulation -----	9
	Remarks -----	10
III. Equipment Allowances:		
	Distribution -----	11
	Recapitulation -----	14
	Remarks -----	14

SECTION I

GENERAL

ORGANIZATION

1. MISSION. a. Primary. To provide chemical testing and analysis of chemical agents and radiological materials in the theater of operations; to process and forward suspected enemy biological agents to a medical laboratory for identification.

b. Secondary. Within priorities established by the theater commander:

(1) To provide theater laboratory development of expedient chemical radiological (CR) devices/protective procedures for use in support of operations.

(2) To provide theater laboratory analysis of industrial chemicals and other items either procured or stored in the theater.

2. ASSIGNMENT. Normally assigned to the theater army and under the operational control of the theater army support command (TASCOM). May be assigned to corps support command (COSCOM) of an independent corps size force.

*TOE 3-97G, 14 June 1968, will be rescinded when units are no longer organized thereunder.

FIGURE 3-20

AD-A078 950

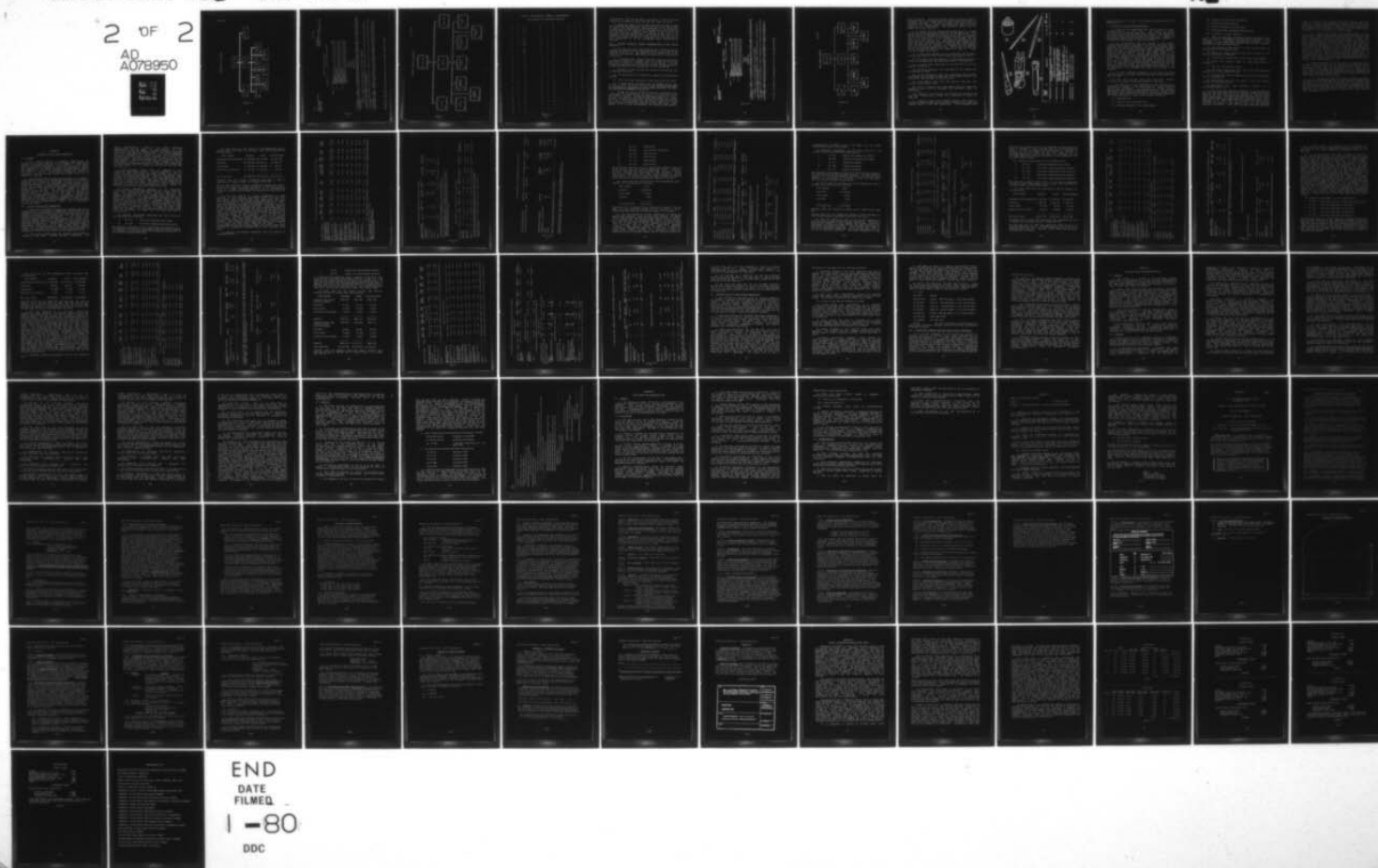
ADJUTANT GENERAL CENTER WASHINGTON DC ADMINISTRATIVE--ETC F/6 14/5
THE ARMY STUDY FOR USER CONVERSION TO MICROPUBLICATIONS (IMPACT--ETC(U)
SEP 79 J G HARDY , H L ROBINSON , E MILEY

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2 OF 2

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GENERAL CHEMICAL LABORATORY

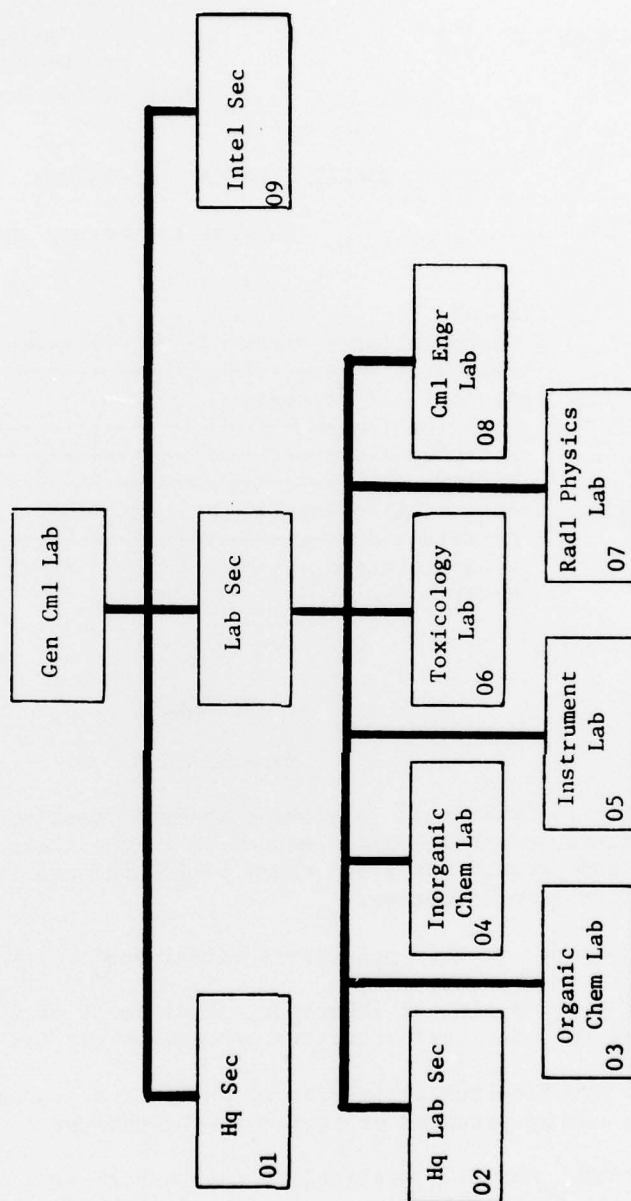


FIGURE 3-21

3-97H

*TOE 3-97H

TABLE OF ORGANIZATION
AND EQUIPMENT
NUMBER 3-97H

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 29 December 1972

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Designation: _____ Chemical Laboratory (General)

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Recapitulation-----	14
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SECTION I

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=====

Intel Sec 09

=====

[illegible]

Radl Physics
Lab

!!!!! "!!!! = \$ \$ \$ \$ \$ \$
\$ \$ Inorganic \$ \$ \$ \$ \$ \$
\$ \$ Chem Lab \$ \$ \$ \$ \$ \$
\$ \$ 04 \$ \$ \$ \$ \$ \$

Organic
Chem Lab

Instrument Lab

81

TABLE OF EQUIVALENCES, SYMBOLS, ALPHA-NUMERICS
3M, LINOLEX TO DATAGRAPHIX AUTO-COM

\$	=		R	=	R	r	=	r
¢	=	—	S	=	S	s	=	s
!	=	┌	T	=	T	t	=	t
=	=	┐	U	=	U	u	=	u
@	=	└	V	=	V	v	=	v
?	=	┘	W	=	W	w	=	w
#	=	T	X	=	X	x	=	x
"	=	└	Y	=	Y	y	=	y
+	=	+	Z	=	Z	z	=	z
A	=	A	a	=	a	1	=	1
B	=	B	b	=	b	2	=	2
C	=	C	c	=	c	3	=	3
D	=	D	d	=	d	4	=	4
E	=	E	e	=	e	5	=	5
F	=	F	f	=	f	6	=	6
G	=	G	g	=	g	7	=	7
H	=	H	h	=	h	8	=	8
I	=	I	i	=	i	9	=	9
J	=	J	j	=	j	0	=	0
K	=	K	k	=	k	:	=	:
L	=	L	l	=	l	;	=	;
M	=	M	m	=	m	.	=	.
N	=	N	n	=	n	,	=	,
O	=	O	o	=	o	/	=	/
P	=	P	p	=	p	'	=	'
Q	=	Q	q	=	q			

FIGURE 3-24

corrections a final run was made, the results of that run on the COM device is shown in Figure 3-25 and 3-26, Pages 84 and 85.

f. Producing simple line art (vertical and horizontal lines) on a business type COM device is not limited to the one we used to develop this publication. Word processors of any description could be used as the input device, provided sufficient characters are available and a magnetic tape output in the form of 133 character lines can be generated. Given the choice of 80 vs 132 character line CRT display the choice would be 132, while it is possible to format 132 character lines on an 80 character display (via wraparound) it is not recommended where efficiency is desired.

3-6 BUSINESS COMPUTER OUTPUT MICROPUBLISHING WITH MERGED GRAPHICS.

a. The Army has over 1,000 publications falling within the category of supply catalogs identified as sets, kits and outfits component lists (CL's). The makeup of these publications is 40% line art illustrations, 40% logistics data and 20% introductory information.

b. In November 1976, ODCSLOG (DALO-SMS) directed that action be taken to review all component lists (CL's) and identify those that lend themselves to publication on microfiche. The USA DARCOM Catalog Data Activity (CDA) was tasked, through HQ DARCOM, to develop a plan for the conversion of CL's to microfiche.

(1) Seven CL's were selected for testing in microfiche form to determine usability.

(2) The microfiche were created via a manual micropublishing process.

(3) Field tests were conducted at Fort Carson and Fort Hood.

(4) A final report available from USA DARCOM Catalog Data Activity is dated 16 October 1978 and titled Certification Report of Conversion to Microfiche of Army Supply Catalogs for Sets, Kits and Outfits Component Lists (CL's).

c. During the period covered by the test, approaches were investigated for implementing the CL's on a broad scale if the tests were successful. Manual micropublishing could, of course, be used, but, updating the publications would remain as it always has been, a labor intensive task. Automation of the publications was a goal, it would provide fast and accurate update if the Army Central Logistics Data Bank could be brought into play. Sixty percent of a CL could be automated, the remaining 40% however,

3-97H

TOE 3-97H

TABLE OF ORGANIZATION
AND EQUIPMENT
NUMBER 3-97H

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DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 25 December 1972

GENERAL CHEMICAL LABORATORY

Designation: Chemical Laboratory (General)

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(2) To provide theater laboratory analysis of industrial chemicals and other items either procured or stored in the theater.

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TOE 3-97G, 14 June 1968, will be rescinded when units are no longer organized thereunder.

FIGURE 3-25

GENERAL CHEMICAL LABORATORY

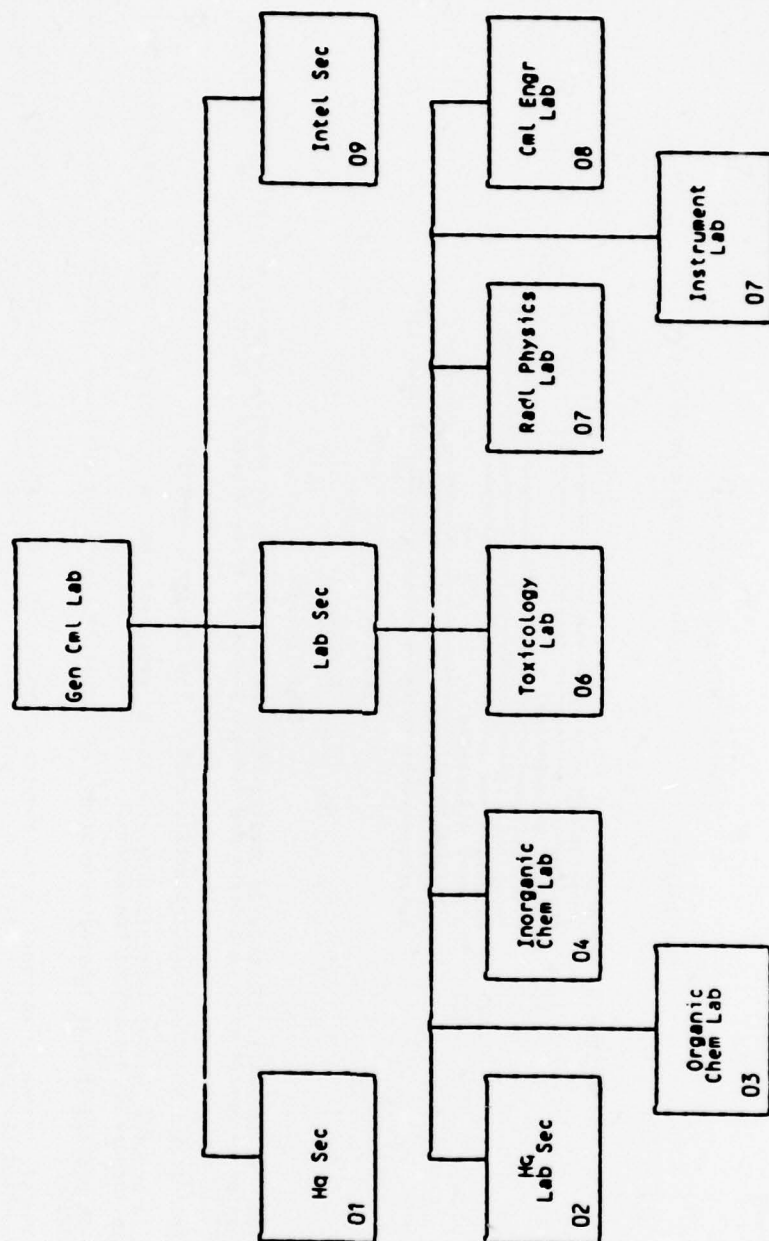


FIGURE 3-26

posed a problem. Unless some simple approach could be found to integrate the illustrations with the text without the usual cut and paste approach. There was of course, the option to use a graphics arts computer output microform device that could scan (digitize) the illustrations. This approach however, did not appear to be cost effective.

d. In October 1977 the study group became aware of a unique option that was being made available on the NCR COM device. This option allows the programmed selection of any one of 120 pieces of art and there merging with alpha-numeric data from magnetic tape on to microfiche. On the surface, this looked like the solution we were looking for. By February 1978 some initial tests had been completed which represented crude approximations of a component list on microfiche. Over the next several months data was refined and original art prepared for the graphics portion of a CL and further tests run. The results of that test can be evaluated by referring to Figure 3-27, Page 87. Figure 3-27 was created as follows:

(1) A 35mm slide was made of the illustration and placed in a slide tray with all other illustrations pertaining to this CL.

(2) The slide tray was placed in a slide projector which is a part of the COM device and under the control of its computer.

(3) A reel of tape containing the text portion of the CL was hung on the COM unit.

(4) Operating parameters were described via the computer and processing initiated.

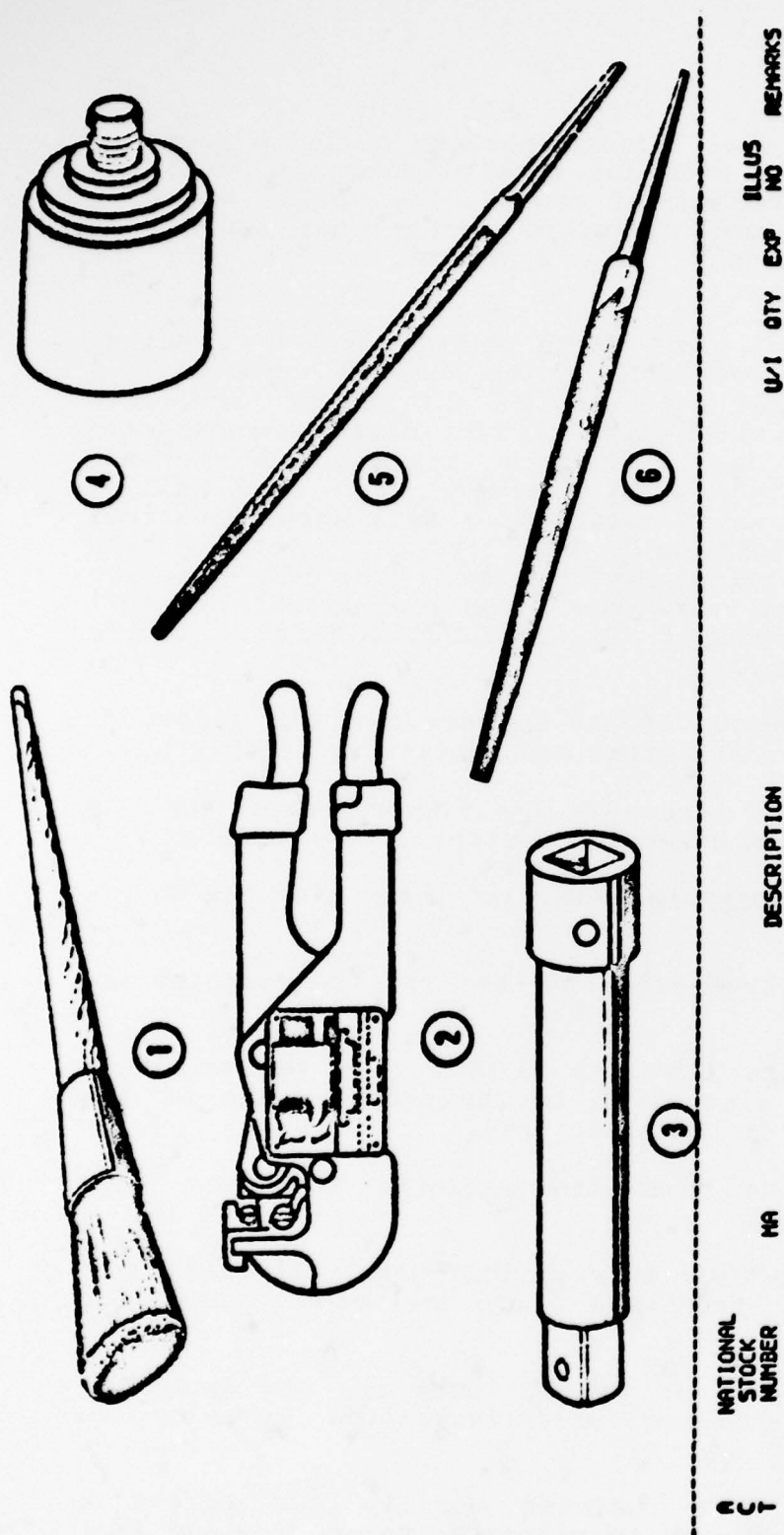
(5) At the appropriate time the illustration was selected, positioned and the image flashed on to the proper frame of the microfiche, then returned to the slide tray.

(6) Alpha-numeric data from the magnetic tape was then written on the frame of film.

(7) Cycle is repeated once every second until all frames are produced, then film is processed and delivered ready for duplicating.

(8) Subsequent revisions of the CL would use new data tape and same illustrations, unless an illustration revision is required.

e. Graphics merge with business quality COM offers a completely new low cost approach to micropublishing provided line printer quality fonts are acceptable. This micropublishing



5180-00-323-4915 CT TOOL KIT, ELECTRICAL REPAIRMAN'S: ARMY AIRCRAFT, SC518099CL006 (81996)

CONSISTING OF THE FOLLOWING COMPONENTS:

BRUSH, PAINT: OVAL, SYN FIL, CHISELED EDGE, 0.875 IN. NOM W, 0.688 IN. NOM THK, 2.125 IN. NOM EXPOSED LG, H-B-491, TYPE 1, CLASS 2, SIZE 6 (81348)

CRIMPING TOOL, TERMINAL, HAND: MANUAL COMPRESSION TYPE, ACCOM 0.0159 MIN, 0.1019 MAX

EXTENSION, SOCKET WRENCH: GGG-H-641, TYPE IV, CLASS 4, STYLE A (81348)

0.250 IN. 50 DRIVE, 2 IN. NOM LG

0.250 IN. 50 DRIVE, 6 IN. NOM LG

A C T	NATIONAL STOCK NUMBER	NA	DESCRIPTION	U/I	QTY	EXP	ILLUS NO	REMARKS
	5180-00-323-4915	CT	TOOL KIT, ELECTRICAL REPAIRMAN'S: ARMY AIRCRAFT, SC518099CLA06 (81996)	KT		N		
	CONSISTING OF THE FOLLOWING COMPONENTS:							
N	8020-00-263-3873	75	BRUSH, PAINT: OVAL, SYN FIL, CHISELED EDGE, 0.875 IN. NOM W, 0.688 IN. NOM THK, 2.125 IN. NOM EXPOSED LG, H-B-491, TYPE 1, CLASS 2, SIZE 6 (81348)	EA	1		1	
N	5120-00-596-9313	75	CRIMPING TOOL, TERMINAL, HAND: MANUAL COMPRESSION TYPE, ACCOM 0.0159 MIN, 0.1019 MAX	EA	1		2	
			EXTENSION, SOCKET WRENCH: GGG-H-641, TYPE IV, CLASS 4, STYLE A (81348)					
	5120-00-227-8105	75	0.250 IN. 50 DRIVE, 2 IN. NOM LG	EA	1		3	
	5120-00-243-7325	75	0.250 IN. 50 DRIVE, 6 IN. NOM LG	EA	1		3	

FIGURE 3-27

approach may solve for repair parts manuals the same problem that exist for CL's.

3-7 GRAPHIC ART QUALITY MICROPUBLISHING.

a. There are two approaches that can be taken to effect micropublications of this type. The first is manual micropublishing of camera ready copy, that approach has already been covered in another section of this Chapter. This section is devoted to graphic art COM produced microfiche only. Graphic art COM produced publications is the most sophisticated approach to automated micropublishing currently in existence.

b. Our investigative area of interest in this subject centered around capabilities and limits of the technology from a useability and quality standpoint. All work was conducted using Information International and Terminal Data Corporation equipment which consisted of a Videocomp 570, 3600 Illustration Scanner, COMP 80/2 and a Documate II Step and Repeat Camera. The Videocomp 570 was used to produce camera ready proof copy of drive tapes containing text and scanned graphics from the 3600 Illustration Scanner prior to producing microfiche on the COMP 80/2. The Documate II camera was used to create original microfiche for comparison against microfiche produced on the COMP 80/2. By using both a Videocomp 570 and a COMP 80/2 we were also able to determine degree of standardization between the two machines as the same drive tape was used on both machines. Due to limitations of the equipment used tests were limited in some respects.

(1) The 3600 Illustration Scanner did not have high speed line art feature, therefore illustrations were scanned using half tone scan mode.

(2) COMP 80/2 did not have half tone write feature, therefore only graphic fonts were created on microfiche.

c. For some time now the Department of Army has been using automation to capture, store and manipulate certain types of publications information. In the area of graphics quality publications the thrust is publications indexes. Our attention was drawn to this group of publications only after several tests had already been conducted in electronic publications preparation for graphic COM output. These initial tests consisted of:

- (1) Capturing text.
- (2) Choosing fonts and point sizes.
- (3) Reformatting pages to be right reading.

- (4) Scanning various kinds of graphics.
- (5) Merging text and graphics.
- (6) Adding and updating the data base.
- (7) Creating camera copy paper and microfiche.
- (8) Evaluation of output products.

d. With the knowledge gained from early testing we were ready to perform a developmental effort that would result in the production of a meaningful micropublished product. The Department of Army publications indexes were selected as primary candidate for the following reasons:

(1) The Adjutant General Center, of which we are a part, is the proponent of the publications.

(2) Number of copies produced rank among highest of any publication (60,000 to 100,000).

(3) Frequency of distribution is every four or six months.

(4) Ninety five percent (95%) of each publication is automated.

(5) Only one illustration is used.

(6) All are of significant size, one is over 650 pages and scheduled for a 20% increase in size.

(7) Printing cost for five years is over two million dollars for four publications.

(8) Distribution cost for five years is over four million dollars for four publications.

(9) Publications are used primarily indoors or in environments under cover.

e. Our first task required automation of the introductory and other non index portions of the indexes, typesetting of this material had not been previously automated. Previous paper issues of the index introductory material had been set in 6 and 8 point Times Roman. We knew from past experience that a serif type font such as Times Roman would not produce as high a quality microform as a sans serif or constant line weight font. Therefore we choose to use Spectra which for all practical purposes is Helvetica. Early tests and past experience indicated

a need to raise the minimum point size from 6 point to 7 point in order to produce an acceptable quality distribution copy microfiche. Tests completed to date have produced an acceptable distribution copy microfiche. However, it is believed that the copy microfiche can be improved if Spectra Light is used in place of Spectra. This refinement is yet to be tested.

f. The second task involved the automated portion of the publication. Tapes formatted for use on the Government Printing Office (GPO) Linotron using Special Times Roman at six point type were reformatted to Spectra seven point type. Initial tests after reformatting and merging with introductory portion of publication produced an acceptable distribution copy microfiche. The automated portion of the indexes have one unfortunate characteristic associated with them, they are all upper case. We plan to try two approaches to further improve the copy quality of this portion of the publication. First use Spectra Light in place of Spectra, second, provide a small increase in the interletter spacing. These refinements are yet to be tested. It is important to note that the first publication worked on was 150 pages in paper form, raising the point size added 47 pages to its length. As a further note, the paper copy was difficult to read, whereas the microfiche was not.

g. While some areas of interest were not fully investigated because certain features were not present on the COMP 80/2 used, we feel confident that line art and half tone images can be generated on microfiche with reasonable effort, the result of which would be acceptable distribution copy. No qualifications are placed on capability of equipment to produce camera ready paper copy containing graphic fonts, line art and half tones for the purpose of microfiche production.

h. In February of 1979 DA PAM 310-4, Index to Technical Publications was prepared using the approaches described above. In April of 1979 DA PAM 310-4 was revised, produced and distributed to the field in microfiche only. This was the first Army publication produced as a fully automated publication using graphic arts quality fonts on microfiche. The reduction ratio used was 1:48, format 420 frames, minimum point size 7 and the page size equals 8.5"x11".

CHAPTER 4

ELECTRONIC PUBLICATIONS PREPARATION

4-1 GENERAL.

a. The current process of preparing publications for printing is out-moded and non-cost effective when compared to present technology available. The IMPACT I Study Report identified these shortcomings in the Army's publication process and proposed an in-house automated micropublishing system. Subsequent work in the IMPACT II Study reinforces the findings of the IMPACT I Study. Publications preparation should be automated, and the process should take place early in the publication creation.

b. The proposed micropublishing system found in the IMPACT I Study Report contained a centralized publications preparation subsystem using automation techniques for data capture, edit, markup and composition. This proposed centralized system alludes to the use, in part, of manuscripts prepared in machine readable form ("stranger tapes and optical character reader (OCR) prepared manuscript"). It does not, however, suggest or promote decentralized preparation. While centralization provides for greater control it does not aid the area of publications preparation of the greatest cost. The IMPACT I proposal was based on technological constraints (significant changes have taken place in the past two years) in hardware, software or cost. Additionally, the primary thrust of IMPACT I was the development of an in-house micropublishing system, not a publications preparation system.

4-2 IN-HOUSE PUBLICATIONS PREPARATION.

a. Review of the IMPACT I Study Report proposal and further investigation into publications preparation requirements by the IMPACT II study team brings forth a description of a publications preparation system in a centralized form that could meet all Army publications preparation requirements. The system could initially support over 400,000 pages annually on a single shift, has full graphics capability, is expandable, and a portion of the described system could be decentralized (10 stand-alone systems are used for data entry). Output from this described system of publications preparation can be camera ready paper, original microfiche, or if publication is to be split-mode, both types of output. All equipment and software is from one manufacturer, and represents a total electronic publications preparation system.

b. Given costs include those for equipment and maintenance, personnel, floor space, overhead and most consumables. The

system configuration is based on an annual throughput approximating 425,000 pages of administrative or like publications having few graphics (graphics increase publication preparation time and costs significantly). The annual throughput rate was established by cutting in half the photocomposer capability (982,800 pages), after providing for 4% setup, test and maintenance time and 10% rerun time, we arrived at 422,604 pages annually. Using this approach one could conclude that one photocomposer could, if run two shifts, support an annual publication page requirement equal to 1,690,416. The computations are based on 6.5 hours of productive time per day with 252 work days in a year.

c. The described system (ours) is composed of four independent subsystems as follows: initial preparation, edit and composition input, page markup and camera original copy creation. Initial preparation involves data capture (keystroking), page proofing and composition markup. Edit and composition input includes revision/correction of previously captured data and the addition of composition codes. Page markup is the formatting of text and/or graphics on a page. Creation of camera original copy requires the use of a photocomposition device capable of producing camera ready paper or original microfiche.

(1) Initial preparation subsystem in the centralized configuration employs 10 independent text edit systems, each with eight text edit/composition input stations, additional 64K memory, 10 megabyte disk (five fixed, five removable), 49 megabyte removable disk, 9 track, 1600 BPI read/write tape drive and a line printer. In a decentralized configuration initial preparation could be satellited in increments equal to 45,000 pages per year (equals one system). Satellite preparation units can be configured for as few as 11,000 pages annually, but were not because costs are not linear. Each of the eighty input stations has a throughput value of 3.5 pages per hour (5,000 characters per page). At this rate in excess of 450,000 pages could be keystroked per annum with 6.5 hours per day of productivity.

(a) Personnel requirements associated with this portion of the subsystem are as follows:

6	GS 12/5	Electronic Composing Team Leader
80	GS 11/5	Electronic Composing Machine Operator

The personnel structure is for a centralized configuration only. A satellite configuration of personnel would have to be based on the complexity of the publications being prepared and the size of the satellite preparation system.

(b) Gross costs for this portion of the subsystem by type of expense over five years for purchase, lease and lease/purchase are as follows:

TYPE EXPENSE	PURCHASE	LEASE	LEASE/PURCHASE
Equipment and Maintenance	\$3,229,500	\$4,017,000	\$3,463,740
Personnel	\$10,469,151	\$10,469,151	\$10,469,151
Floor Space	\$ 286,415	\$ 286,415	\$ 286,415
Materials and Overhead	\$ 104,436	\$ 104,436	\$ 104,436
<hr/>			
Five Year Total	\$14,089,502	\$14,877,002	\$14,323,742

Detailed costs for initial preparation subsystem by item of expense are at Figures 4-28a, b, c, Pages 94, 95, 96.

The per page cost for initial preparation excluding the cost of proofing and composition markup is \$6.27 in a purchase situation, \$6.62 in a lease situation and \$6.37 in a lease/purchase situation, assuming 450,000 pages are prepared per annum for five years.

(2) The next element of initial preparation is copy proofing. At this step of preparation several functions could take place, some functions may take place more than once depending on whether this element of the subsystem is in support of a centralized or satellite preparation subsystem. In a satellite operation proofing could include correcting, revising, adding and deleting information (editing). Following insertion of the changes to the data base the cycle would be repeated for as many iterations as necessary to bring the manuscript to final copy. In a centralized preparation subsystem the Publications Directorate editors may cause the cycle to be repeated due to rewrite and return to the proponent. (This is not a rare occurrence). However, proofing might consist of only checking for accuracy the final draft submitted by the proponent. Proofing for accuracy of information keystroked is usually a team approach. The throughput for a team (two persons) is estimated at 16 pages per hour (5000 characters per page). In a centralized proofing operation we assume that errors found during proofing are accurately corrected and no other proofing takes place.

(a) Personnel requirements associated with this portion of the subsystem are:

5 YEAR EQUIPMENT AND MAINTENANCE COSTS (PURCHASE, LEASE, AND LEASE/PURCHASE) FOR DATA CAPTURE

DESCRIPTION OF EQUIPMENT	QUANTITY	UNIT PURCHASE PRICE	UNIT MAINT PER YR	TOTAL PURCHASE PRICE	TOTAL MAINT PER YR	TOTAL MAINT 5-YRS	5-YEAR PURCHASE/MAINT COST	UNIT LEASE PRICE PER YR	TOTAL LEASE PRICE PER YR	5-YEAR LEASE COST	5-YEAR LEASE/ PURCHASE*
Text Editing and Composition System with 64K memory, 2 CRT edit terminals, 5 Megabyte disc storage unit (2.5 Megabyte fixed 2.5 Megabyte removal)	10	\$62,500	\$7,200	\$625,000	\$72,000	\$360,000	\$985,000	\$24,000	\$240,000	\$1,200,000	\$1,057,000
Additional 64K byte memory	10	18,000	1,920	180,000	19,200	96,000	276,000	7,080	70,800	354,000	299,280
Additional CRT edit terminals (10 Sets of 6) above 4 requires 1 additional 64K byte memory	60	3,750	420	225,000	25,200	126,000	351,000	1,500	90,000	450,000	379,800
10 Megabyte disc unit (5-Mbyte removable) in lieu of basic system disc	10	7,500	840	75,000	8,400	42,000	117,000	3,000	30,000	150,000	126,600
49-Megabyte Disc storage Unit with removable platter-(requires a disc controller)	10	25,500	3,120	255,000	31,200	156,000	411,000	10,200	102,000	510,000	441,000
Disc Controller for 49-Megabyte disc storage unit with removable platter	10	13,500	1,800	135,000	18,000	90,000	225,000	5,400	54,000	270,000	239,400
9-Track, 1600 BPI, 45 IPS MTU (magnetic tape unit) (requires a read/write controller)	10	22,750	4,080	227,500	40,800	204,000	431,500	10,560	105,600	528,000	454,060
Head/Write Controller for 1600 BPI MTU	10	10,000	1,500	100,000	15,000	75,000	175,000	4,500	45,000	225,000	187,000
Line Printer, up to 500 Lines/Minutes, 96 character ASCII	10	16,800	1,800	168,000	18,000	90,000	258,000	6,600	66,000	330,000	279,600
TOTALS	140	\$180,300	\$22,680	\$1,990,500	\$247,800	\$1,239,000	\$3,229,500	\$72,840	\$803,400	\$4,017,000	\$3,463,740

*Five Year Lease/Purchase with Maintenance Equals Purchase Price + 1 Year Lease Cost

- 40% of up to the last 12 months rental cost

+ Number of months (this study used 48 months) of maintenance to equal 5 years

FIGURE 4-28A

5 YEAR FLOOR SPACE (SQUARE FOOTAGE) COSTS FOR DATA CAPTURE

EQUIPMENT/PERSONNEL REQUIRING FLOOR SPACE	QUANTITY	SPACE FOOTAGE EACH	COST PER* SQUARE FT	SQUARE FOOT TOTAL	FLOOR SPACE COST 1 YEAR	FLOOR SPACE COST 5 YEARS
Supplemental Air Conditioners	8	15	\$ 8.64	120	\$ 1,037	\$ 5,185
Line Printers	10	9	8.64	90	778	3,890
Processors	10	126	8.64	1,260	10,886	54,430
Personnel	86	60**	8.64	5,160	44,582	222,910
TOTALS	114			\$5,630	\$57,283	\$286,415

* \$8.64 is Data Processing cost per square foot. It was obtained from the DOD Administrator for Space and Building Management at the Forrestal Building.

** Personnel floor space equals 60 square feet/person. For the 6 supervisory personnel, 60 square feet/person includes 1 desk, 1 chair, and personal floor space. For the 80 Electronic Composing Machine Operators, 60 square feet/person includes 1 desk, 1 chair, 1 Ckt edit terminal, and personal floor space.

5 YEAR PERSONNEL COSTS (SALARY & BENEFITS) FOR DATA CAPTURE

DESCRIPTION	STRENGTH	GRADE	1 YR SALARY*	1 YR BENEFITS**	TOTAL 1 YR SALARY	TOTAL 1 YR BENEFITS	TOTAL 5 YRS SALARY	TOTAL 5 YRS BENEFITS	5 YR TOTAL SALARY/BENEFITS
Elec Comp Team Leader	6	GS 12/5	\$26,167	\$ 2,617	\$ 157,002	\$ 15,700	\$ 785,010	\$ 78,501	\$ 863,511
Elec Comp Machine Op	80	GS 11/5	\$21,831	\$ 2,183	\$1,746,480	\$174,648	8,732,400	873,240	9,605,640
TOTALS	86		\$47,998	\$ 4,800	\$1,903,482	\$190,348	\$9,517,410	\$951,741	\$10,469,151

* The salaries were constructed based on comparable tasks and thruput rates found at the Government Printing Office/salaries based on GS pay rates in effect 1 October 1978.

** Benefits figured at 10%. Percentage obtained from Office Secretary of the Army, Legislative Liaison.

FIGURE 4-28B

5 YEAR MATERIALS AND OVERHEAD COSTS FOR DATA CAPTURE

DESCRIPTION OF MATERIALS	QUANTITY-1 YR	QUANTITY-5 YR	COST PER SHEET	1 YEAR COST	5 YEAR COST
Line Printer Paper (Single part)	500,000	2,500,000	.01	\$5,000	\$25,000

DESCRIPTION OF OVERHEAD	QUANTITY	COST EA PER YR	1 YR COST TOTAL	5 YR COST TOTAL
Supplemental Air Conditioners	8	\$1,500	\$12,000	\$60,000
Desks	86	158	\$13,588	\$13,588
Chairs	86	68	5,848	5,848

Total 5 Year Materials and Overhead Costs for Data Capture

\$104,436

Desks and chairs are initial year costs. 5 year costs same as first year.
Cost for each desk and chair obtained from Centralized Support Division, TAGCEN.

FIGURE 4-28C

1	GS 14/5	Supervisory
3	GS 13/5	Page Proofer Team Leader
3	GS 12/5	Page Proofer
15	GS 11/5	Page Proofer
15	GS 9/5	Page Proofer
3	GS 7/5	Page Proofer

The personnel structure is for a centralized situation only and would provide for over 470,000 pages per annum. Satellite personnel requirements would be proportional to size of system. No edit functions are performed in this subsystem, current Publications Directorate edit staff would continue to provide edit support. A satellite operation might consider having the writers accomplish initial proofing as a process of rewrite.

(b) Gross costs for this portion of the subsystem by type of expense over five years are as follows:

TYPE EXPENSE	COST
Personnel	\$4,680,394
Floor Space	103,680
Overhead	9,040

FIVE YEAR TOTAL	\$4,793,114
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Detailed costs for proofing are at Figure 4-29, Page 98. The per page cost for proofing without an edit function is \$2.13, assuming 450,000 pages are proofed per annum for five years.

(3) The last element of initial preparation is composition markup (page marking). This function, like proofing, is a manual task in the current publications preparation process. Initially, it is assumed that the function would remain a manual process, but, with transition to performing the task on a video display text edit or page make up device, composition markup now takes place centrally and at individual publication proponent locations. Page marking consists of adding to a manuscript instructions (composition codes) as to type font, point size, column width, length, indents, etc., necessary to cause the composing device to produce camera copy or original microfiche.

5 YEAR PERSONNEL COSTS (SALARY AND BENEFITS) FOR PAGE PROOFING

DESCRIPTION	STRENGTH	GRADE	1 YR SALARY	1 YR BENEFITS	TOTAL 1 YR SALARY	TOTAL 1 YR BENEFITS	TOTAL 5 YR SALARY	TOTAL 5 YR BENEFITS	5 YR TOTAL SALARY/BENEFITS
Management	1	GS 14/5	\$ 36,766	\$ 3,677	\$ 36,777	\$ 3,677	\$ 183,830	\$ 18,383	\$ 202,213
Supervisory	3	GS 13/5	31,113	3,111	93,339	9,334	466,695	46,669	513,364
Page Proofing	3	GS 12/5	26,167	2,617	78,501	7,850	392,505	39,250	431,755
Page Proofing	15	GS 11/5	21,831	2,183	327,465	32,746	1,637,325	163,732	1,801,057
Page Proofing	15	GS 9/5	18,044	1,804	270,660	27,066	1,353,300	135,330	1,488,630
Page Proofing	3	GS 7/5	14,750	1,475	44,250	4,425	221,250	22,125	243,375
TOTALS	40		\$148,671	\$850,981	\$ 85,098	\$ 85,098	\$4,254,905	\$425,489	\$4,680,394

5 YEAR FLOOR SPACE (SQUARE FOOTAGE) COSTS FOR PAGE PROOFING

EQUIPMENT/PERSONNEL REQUIRING FLOOR SPACE	QUANTITY	SPACE FOOTAGE EACH	COST PER SQUARE FOOT	SQUARE FOOT TOTAL	FLOOR SPACE COST 1 YEAR	FLOOR SPACE COST 5 YEARS
Personnel	40	60*	\$8.64	2,400	\$20,736	\$103,680

*Personnel floor space equals 60 square feet/person. For the 1 manager, 3 supervisors, and 36 page proofing personnel, 60 square feet/person includes 1 desk, 1 chair, and personal floor space.

5 YEAR MATERIALS AND OVERHEAD COSTS FOR PAGE PROOFING

DESCRIPTION OF MATERIALS

DESCRIPTION OF OVERHEAD	QUANTITY	COST EACH	TOTAL 1 YR COST	TOTAL 5 YR COST
None				
Desks	40	\$158	\$6,320	\$6,320
Chairs	40	68	2,720	2,720

TOTAL 5 YEAR MATERIALS AND OVERHEAD COSTS FOR PAGE PROOFING \$9,040

A conservative throughput rate of 20 pages per hour (5000 characters per page), is estimated.

(a) Personnel requirements for this final portion of the initial publications preparation subsystem are:

1	GS 13/5	Supervisory Composition Marker
1	GS 12/5	Composition Marker Team Leader
2	GS 11/5	Composition Marker
3	GS 9/5	Composition Marker
6	GS 7/5	Composition Marker

The personnel requirements defined are for centralized operation and would provide for 425,000 pages annually. For administrative publications composition markup is usually a central function. However, it is possible to envision a point in time where satellite operation might be practicable.

(b) Gross costs for this portion of the subsystem by type of expense over five years are as follows:

TYPE EXPENSE	COST
Personnel	\$1,339,656
Floor Space	33,695
Overhead -	2,938
<hr/>	
FIVE YEAR COST	\$1,376,289

Detailed costs for composition markup are at Figure 4-30, Page 100.

The per page cost for composition markup is \$0.65 assuming at least 425,000 pages are marked per year for five years.

(4) Edit and composition input is the second subsystem of this described system of publications preparation. With edit, proofing and composition markup complete the changes; corrections and composition codes are added to the data base containing the originally keystroked manuscript. This function like those in the initial preparation subsystem could be accomplished centrally or via a satellite operation. Providing information in the

5 YEAR PERSONNEL COSTS (SALARY AND BENEFITS) FOR PAGE MARKUP

DESCRIPTION	STRENGTH	GRADE	1 YR SALARY	1 YR BENEFITS	TOTAL 1 YR SALARY	TOTAL 1 YR BENEFITS	TOTAL 5 YR SALARY	TOTAL 5 YR BENEFITS	5 YR TOTAL SALARY/BENEFITS
Page Markup	1	GS 13/5	\$ 31,113	\$ 3,111	\$ 31,113	\$ 3,111	\$ 155,565	\$ 15,556	\$ 171,121
Page Markup	1	GS 12/5	26,167	2,617	26,167	2,617	130,835	13,083	143,918
Page Markup	2	GS 11/5	21,831	2,183	43,662	4,366	218,310	21,831	240,141
Page Markup	3	GS 9/5	18,044	1,804	54,132	5,413	270,660	27,066	297,726
Page Markup	6	GS 7/5	14,750	1,475	88,500	8,850	442,500	44,250	486,750
TOTALS	13		\$111,905	\$11,190	\$243,574	\$ 24,357	\$1,217,870	\$ 121,786	\$ 1,339,656

5 YEAR FLOOR SPACE (SQUARE FOOTAGE) COSTS FOR PAGE MARKUP

EQUIPMENT/PERSONNEL REQUIRING FLOOR SPACE	QUANTITY	SPACE FOOTAGE EACH	COST PER SQUARE FOOT	SQUARE FOOT TOTAL	FLOOR SPACE COST 1 YR	FLOOR SPACE COST 5 YRS
Personnel	13	60*	\$8.64	780	\$ 6,739	\$ 33,695

*Personnel floor space equals 60 square feet/person. For the 13 page markup personnel, 60 square feet/person includes 1 desk, 1 chair, and personal floor space.

5 YEAR MATERIALS AND OVERHEAD COSTS FOR PAGE MARKUP

DESCRIPTION OF MATERIALS	QUANTITY	COST EACH	TOTAL 1 YEAR COST	TOTAL 5 YEAR COST
None				
DESCRIPTION OF OVERHEAD				
Desks	13	\$ 158	\$ 2,054	\$ 2,054
Chairs	13	68	884	884
TOTAL 5 YEAR MATERIALS AND OVERHEAD COSTS FOR PAGE MARKUP				\$ 2,938

publication is limited to text, all necessary instructions can be given to generate a fully composed page on the photocomposing device. If rules for tables or other purposes are required, or graphics are to be merged with the text, then use of the following subsystem will come into play. The throughput rate for edit and composition input is estimated at eleven pages per hour for 5000 character pages.

(a) Personnel requirements for this subsystem are:

2	GS 11/5	Electronic Composing Team Leader
2	GS 6/5	Electronic Composing Machine Operator
2	GS 5/5	Electronic Composing Machine Operator
6	GS 4/5	Electronic Composing Machine Operator
12	GS 3/5	Electronic Composing Machine Operator

The personnel structure here, like in the initial preparation subsystem, takes into account only a central type operation for the same reasons as previously stated.

(b) Gross costs for this subsystem by type of expense over five years are:

TYPE EXPENSE	PURCHASE	LEASE	LEASE/PURCHASE
Equipment and Maintenance	\$ 891,450	\$1,106,100	\$ 955,242
Personnel	1,494,141	1,494,141	1,494,141
Floor Space	64,155	64,155	64,155
Materials and Overhead	27,924	27,924	27,924
FIVE YEAR COSTS	\$2,477,670	\$2,692,320	\$2,541,462

Detailed costs for edit and composition input subsystem by item of expense are at Figures 4-31a, b, Pages 102, 103.

The per page cost for edit and composition input is \$1.17 in purchase situation, \$1.27 in lease situation and \$1.20 in a lease/purchase situation, assuming 425,000 pages are processed per annum for five years.

5 YEAR EQUIPMENT AND MAINTENANCE COSTS (PURCHASE, LEASE, AND LEASE/PURCHASE) FOR EDIT AND COMPOSITION INPUT

DESCRIPTION OF EQUIPMENT	QUANTITY	UNIT PURCHASE PRICE	UNIT MAINT PER YR	TOTAL PURCHASE PRICE	TOTAL MAINT PER YR	TOTAL MAINT 5 YRS	5 YR PURCHASE/MAINT COST	UNIT LEASE PRICE PER YR	TOTAL LEASE PRICE PER YR	5 YR LEASE COST	5 YR LEASE/PURCHASE
Text Editing and Composition											
System with 64K memory, 2 CRT edit terminals, 5 Megabyte Disc Storage Unit (2.5 Megabyte fixed 2.5 Megabyte removal)	3	\$ 62,500	\$ 7,200	\$ 187,500	\$ 21,600	\$ 108,000	\$ 295,500	\$ 24,000	\$ 72,000	\$ 360,000	\$ 317,100
Additional 64K byte Memory	3	18,000	1,920	54,000	5,760	28,800	82,800	7,080	21,240	106,200	89,784
Additional CRT edit terminals (10 Sets of 6) above 4 requires 1 add'l 64K byte memory	18	3,750	420	67,500	7,560	37,800	105,300	1,500	27,000	135,000	113,940
10 Megabyte Disc Unit (5 Mbyte removable) In lieu of basic system disc	3	7,500	840	22,500	2,520	12,600	35,100	3,000	9,000	45,000	37,980
49-Megabyte Disc Storage Unit with removable platter - (requires a disc controller)	3	25,500	3,120	76,500	9,360	46,800	123,300	10,200	30,600	153,000	132,300
Disc Controller for 49 Megabyte Disc Storage Unit with removable platter	3	13,500	1,800	40,500	5,400	27,000	67,500	5,400	16,200	81,000	71,820
9-Track, 1600 BPI, 45 IPS MTU (magnetic Tape Unit) (requires a read/write controller)	3	22,750	4,080	68,250	12,240	61,200	139,450	10,560	31,680	158,400	136,218
Read/Write Controller for 1600 BPI MTU	3	10,000	1,500	30,000	4,500	22,500	52,500	4,500	13,500	67,500	56,100
TOTALS	39	\$163,500	\$20,880	\$546,750	\$68,940	\$ 344,700	\$891,450	\$66,240	\$221,220	\$1,106,100	\$ 955,242

5 YEAR PERSONNEL COSTS (SALARY & BENEFITS) FOR EDIT AND COMPOSITION INPUT

DESCRIPTION	STRENGTH	GRADE	1 YR SALARY	1 YR BENEFITS	TOTAL 1 YR SALARY & BENEFITS	TOTAL 5 YRS SALARY	TOTAL 5 YRS BENEFITS	5 YEAR TOTAL SALARY/BENEFITS
Elec Comp Machine Op	2	GS 11/5	\$ 21,831	\$ 2,183	\$ 43,662	\$ 218,310	\$21,831	\$240,141
Elec Comp Machine Op	2	GS 6/5	\$ 13,272	1,327	26,544	132,720	13,272	145,992
Elec Comp Machine Op	2	GS 5/5	11,907	1,191	23,814	119,070	11,907	130,977
Elec Comp Machine Op	6	GS 4/5	10,643	1,064	63,858	319,290	31,929	351,219
Elec Comp Machine Op	12	GS 3/5	9,482	948	113,784	568,920	56,892	625,812
TOTALS	24		\$ 67,135	\$ 6,713	\$ 271,662	\$1,358,310	\$135,831	\$1,494,141

FIGURE 4-31A

5 YEAR FLOOR SPACE (SQUARE FOOTAGE) COSTS FOR EDIT AND COMPOSITION INPUT						
EQUIPMENT/PERSONNEL REQUIRING FLOOR SPACE	QUANTITY	SPACE FOOTAGE EACH	COST PER SQUARE FOOT	SQUARE FOOT TOTAL	FLOOR SPACE COST 1 YEAR	FLOOR SPACE COST 5 YEARS
Supplemental Air Conditioners	3	15	\$8.64	45	\$ 389	\$ 1,945
Personnel	24	60*	\$8.64	1,440	12,442	62,210
Totals	27	--		1,485	\$ 12,831	\$ 64,155

*Personnel floor space equals 60 square feet/person. For 24 Electronic Composing Machine Operators, 60 square feet/person includes 1 desk, 1 chair, 1 CRT edit terminal, and personal floor space.

5 YEAR MATERIALS AND OVERHEAD COSTS FOR EDIT AND COMPOSITION INPUT

DESCRIPTION OF MATERIALS

None

DESCRIPTION OF OVERHEAD	QUANTITY	COST EACH	TOTAL 1 YEAR COST	TOTAL 5 YEAR COST
Desks	24	\$ 158	\$ 3,792	\$ 3,792
Chairs	24	68	1,632	\$ 1,632
Supplemental Air Conditioners	3	\$1,500	4,500	22,500
TOTAL 5 YEAR MATERIALS AND OVERHEAD COSTS FOR EDIT AND COMPOSITION INPUT				\$27,924

(c) A close review of the equipment in this subsystem will reveal that it is three completely independent systems of the type used in the initial preparation subsystem minus the line printers.

(5) The third subsystem, page make-up, might be referred to as the cut and paste station. Here pages are made up, rules added to text and graphics merged with text to make complete pages as they are to appear in final form. In the process of merging graphics they can be sized (up or down), cropped, portions erased or text added. During the IMPACT I test of a prototype micropublishing system an electronic cut and paste station where text and graphics were merged was not available. IMPACT I merged graphics with text via a slow manual process of inserting graphic carrying slides in the photocomposer and writing around the graphic portion of the page. The inability of the IMPACT I prototype micropublishing system (proposed), to perform cut and paste electronically would appear to be reason enough to propose a centralized operation. With this subsystem, satellite operations are possible but may not be practical from an economic point (graphics input device in following subsystem is required for graphics inclusion). One shortcoming of the subsystem is a software program to effect forms design. Forms will be treated as illustrations and captured on the graphics input device. A throughput rate of 30 pages per hour has been established on the basis that most administrative publications have few, if any, graphics. Those with information qualifying as graphic in nature are usually full page items requiring little fitting.

(a) Personnel requirements for this subsystem are:

- | | | |
|---|---------|--|
| 1 | GS 13/5 | Supervisory Electronic Page Make Up Specialist |
| 1 | GS 12/5 | Electronic Page Make Up Specialist |
| 1 | GS 11/5 | Electronic Page Make Up Specialist |
| 2 | GS 9/5 | Electronic Page Make Up Specialist |
| 4 | GS 7/5 | Electronic Page Make Up Specialist |

The personnel structure is again based on centralized operations. The described subsystem is two independent systems of four work stations each. A group of satellite systems consisting of less than four stations would be non-cost effective when compared to a central operation using a four station configuration. While a few proponents of technical manuals may be able to justify the four station configuration, they would also need to justify a graphics input device.

(b) Gross costs for this subsystem by type of expense over five years are:

TYPE EXPENSE	PURCHASE	LEASE	LEASE/PURCHASE
Equipment and Maintenance	\$1,870,850	\$2,276,400	\$2,004,698
Personnel	958,093	958,093	958,093
Floor Space	23,980	23,980	23,980
Materials and Overhead	27,034	27,034	27,034
FIVE YEAR COSTS	\$2,879,957	\$3,285,507	\$3,013,805

Detailed costs for the page make up subsystem, by item of expense, are at Figures 4-32a, b, Pages 106, 107. The per page make-up cost is \$1.48 in a purchase situation, \$1.69 in a lease situation and \$1.55 in a lease/purchase situation, assuming over 390,000 pages are made up per annum for five years.

(6) The last subsystem of the electronic publications preparation system consists of two separate elements. One is the graphics input device and the other is the camera original copy creation device. The two elements are grouped together more to provide continuity of operations than for any other reason; it is a centralized configuration. In a satellite operation there is very little chance of justifying more than the graphics input device because of the throughput capability of the original camera copy creation device (982,800 pages per annum, single shift). The graphics input device digitizes line art and continuous tone photographs, has crop, mask and sizing features and accepts positive image material. The graphics input device must be considered as an necessary investment to achieve 100% electronic publications preparation. The limited number of graphic type pages in the administrative publications cannot, alone, justify the device, however, upon moving into other publications areas the equipment would become cost effective. The camera original copy creation device is a full feature photocomposition device capable of producing high quality graphic arts characters, lines and half tone images full size on paper or film or reduced size on many types of microforms. The annual page throughput rate of 982,800 has been developed based on 252 work days per year with 6.5 hours productivity per day and the machine recording rate.

(a) Personnel staffing requirements for this last subsystem are:

5 YEAR EQUIPMENT AND MAINTENANCE COSTS (PURCHASE, LEASE, AND LEASE/PURCHASE) FOR PAGE MAKEUP

DESCRIPTION OF EQUIPMENT	QTY	UNIT PURCHASE PRICE	UNIT MAINT PER YR	TOTAL PURCHASE PRICE	TOTAL MAINT PER YR	TOTAL MAINT 5 YRS	5 YR PURCHASE/ MAINT COST	UNIT LEASE PRICE PER YR	TOTAL LEASE PRICE PER YR	5 YR LEASE COST	5 YR LEASE/ PURCHASE
Page makeup system w/9 track 1600BPI, 45IPS, and read/ write controller	2	\$122,500	\$13,500	\$245,000	\$27,000	\$135,000	\$380,000	\$43,740	\$87,480	\$437,400	\$405,488
Additional page makeup sta- tions (two sets of 3) Second station requires an addi- tional byte memory	6	56,000	6,000	336,000	36,000	180,000	516,000	21,000	126,000	630,000	555,600
Additional 32K byte memory	2	12,000	1,380	24,000	2,760	13,800	37,800	4,800	9,600	48,000	40,800
Additional 5-megabyte disc capacity (removal platter)	2	11,250	1,440	22,500	2,880	14,400	36,900	4,800	9,600	48,000	39,780
49-megabyte disc unit (re- movable type disc pack). Re- quires a controller per 4 disc unit	16	25,500	3,120	408,000	49,920	249,600	657,600	10,200	163,200	816,000	705,600
Controller for 49-megabyte disc unit	4	13,500	1,800	54,000	7,200	36,000	90,000	5,400	21,600	108,000	95,760
9-Track, 1600 BPI, 45 IPS, tape drive	2	22,750	4,080	45,500	8,160	40,800	86,300	10,560	21,120	105,600	90,812
Read/Write controller for 9-track, 1600BPI, tape drive	2	10,000	1,500	20,000	3,000	15,000	35,000	4,500	9,000	45,000	37,400
Hardcopy adapter for display Monitor	2	9,625	1,200	19,250	2,400	12,000	31,250	3,840	7,680	38,400	33,458
TOTALS	38	\$283,125	\$34,020	\$1,174,250	\$139,320	\$696,600	\$1,870,850	\$108,840	\$455,280	\$2,276,400	\$2,004,698

5 YEAR PERSONNEL COSTS (SALARY & BENEFITS) FOR PAGE MAKEUP

DESCRIPTION	STRENGTH	GRADE	1 YR SALARY	1 YR BENEFITS	TOTAL 1 YR SALARY	TOTAL 1 YR BENEFITS	TOTAL 5 YRS SALARY	TOTAL 5 YRS BENEFITS	5 YR TOTAL SALARY/BENEFITS
Supervisory	1	GS 13/5	\$31,113	\$3,111	\$31,113	\$3,111	\$155,565	\$15,556	\$171,121
Elec Page Makeup Spec	1	GS 12/5	\$26,167	\$2,617	\$26,167	\$2,617	\$130,835	\$13,083	\$143,918
Elec Page Makeup Spec	1	GS 11/5	\$21,831	\$2,183	\$21,831	\$2,183	\$109,155	\$10,915	\$120,070
Elec Page Makeup Spec	2	GS 9/5	\$18,044	\$1,804	\$36,088	\$3,609	\$180,440	\$18,044	\$198,484
Elec Page Makeup Spec	4	GS 7/5	\$14,750	\$1,475	\$59,000	\$5,900	\$295,000	\$29,500	\$324,500
TOTALS	9		\$111,905	\$11,190	\$174,199	\$17,420	\$870,995	\$87,098	\$958,093

FIGURE 4-32A
106

5 YEAR FLOOR SPACE (SQUARE FOOTAGE) COSTS FOR PAGE MAKEUP

EQUIPMENT/PERSONNEL REQUIRING FLOOR SPACE	QUANTITY	SPACE FOOTAGE EACH	COST PER SQUARE FT	SQUARE FOOT TOTAL	FLOOR SPACE COST 1 YR	FLOOR SPACE COST 5 YR
Supplemental Air Conditioners	1	15	\$8.64	15	\$130	\$ 650
Personnel	9	60*	\$8.64	540	\$4,666	\$23,330
TOTALS	10	--		555	\$4,796	\$23,980

* Personnel floor space equals 60 square feet/person. For the 8 electronic page makeup operators, 60 square feet/person includes 1 desk, 1 chair, 1 page markup station, and personal floor space. For the 1 supervisor, 60 square feet/person includes 1 desk, 1 chair, and personal floor space.

FIGURE 4-32B
107

5 YEAR MATERIALS AND OVERHEAD COSTS FOR PAGE MAKEUP

DESCRIPTION OF MATERIALS	QUANTITY	COST EACH	TOTAL 1 YEAR COST	TOTAL 5 YEAR COST
Proof Copy Paper (Per roll)	100	\$ 50	\$5,000	\$25,000

DESCRIPTION OF OVERHEAD

Desks	9	\$158	\$1,422	\$1,422
Chairs	9	68	612	612

Total Year Materials and Overhead Costs for Page Makeup

\$27,034

1 GS 9/5 Graphic Art Photocomposer Operator

1 GS 7/5 Graphic Art Photocomposer Operator

In a decentralized operation where a graphics input device was justified the personnel requirement would be one GS 7/5. The graphics input device would be co-located and interfaced with the page make up device and completed publications would be sent in magnetic tape form to the centralized operation for production on the camera original copy creation device. An alternate approach would be to use contract services to create the original copy.

(b) Gross costs for the camera original copy creation subsystem by type of expense over five years are:

TYPE EXPENSE	PURCHASE	LEASE	LEASE/PURCHASE
Graphics Input Device with Maintenance	\$357,350	\$401,400	\$382,238
Personnel	81,125	81,125	81,125
Floor Space	10,020	10,020	10,020
Materials and Overhead	8,726	8,726	8,726
 SUBTOTAL	 \$457,221	 \$501,271	 \$482,109
Camera Original Copy Creation Device with maintenance	\$797,005	\$989,400	\$860,773
Personnel	99,242	99,242	99,242
Floor Space	11,880	11,880	11,880
Materials and Overhead	13,849	13,849	13,849
 SUBTOTAL	 \$921,976	 \$1,114,371	 \$985,744
FIVE YEAR COST	\$1,379,197	\$1,615,642	\$1,467,853

Detailed costs for graphics input and camera original copy creation by item of expense are at Figures 4-33a, b, c, Pages 109, 110, 111.

5 YEAR EQUIPMENT/MAINTENANCE COSTS (PURCHASE, LEASE, AND LEASE/PURCHASE) FOR CAMERA ORIGINAL COPY CREATION

DESCRIPTION OF EQUIPMENT	QUANTITY	UNIT	UNIT	TOTAL	TOTAL	TOTAL	5 YEAR	LEASE	LEASE	5 YEAR	5 YEAR
		PURCHASE	MAINT					PURCHASE PRICE	PRICE		
		PRICE	PER YR	PRICE	PER YR	MAINT	COST	PER YR	PER YR	COST	PURCHASE
GRAPHICS INPUT DEVICE											
Illustration Scanner System w/9 track 1600BPI tape drive	1	\$204,000	\$20,520	\$204,000	\$20,520	\$102,600	\$ 306,600	\$ 67,680	\$ 67,680	\$ 338,400	\$ 326,688
Extra Copy Board	1	950	180	950	180	900	1,850	480	480	2,400	1,958
High Speed Line Drawing Scan Feature	1	24,000	1,200	24,000	1,200	6,000	30,000	7,320	7,320	36,600	33,192
32K Byte Memory Extension	1	12,000	1,380	12,000	1,380	6,900	18,900	4,800	4,800	24,000	20,400
SUB-TOTAL	4	\$240,950	\$23,280	\$240,950	\$23,280	\$116,400	\$ 357,350	\$ 80,280	\$ 80,280	\$ 401,400	\$ 382,238
CAMERA ORIGINAL COPY CREATION DEVICE											
Comp 80/2 Basic System less 35mm camera but w/9 track 1600BPI tape drive	1	\$296,355	\$26,040	\$296,355	\$26,040	\$130,200	\$ 426,555	\$112,560	\$112,560	\$ 562,800	\$ 468,051
True Size Hardcopy Recording Capability	1	75,000	8,100	75,000	8,100	40,500	115,500	26,400	26,400	132,000	123,240
Core Memory Extension, 16K Words	1	16,000	1,440	16,000	1,440	7,200	23,200	6,600	6,600	33,000	25,720
Line Drawing Record (Requi- res Core Memory Extension, 16K Words & Dual MTUs)	1	28,000	3,120	28,000	3,120	15,600	43,600	9,240	9,240	46,200	46,024
Halftone Record (Required Core Memory Ext., 16K words)	1	42,500	5,100	42,500	5,100	25,500	68,000	15,000	15,000	75,000	71,900
105mm Microfiche Camera, NMA Format Control, 24X & 42X Reduction	1	28,500	4,800	28,500	4,800	24,000	52,500	12,000	12,000	60,000	54,900
105mm Microfiche Camera, 42X and 48X Reduction	1	31,500	5,520	31,500	5,520	27,600	59,100	13,800	13,800	69,000	61,860
Extra Magazine for 105mm Microfiche Camera (Specify Camera model)	2	1,200	240	2,400	480	2,400	4,800	720	1,440	7,200	5,184
Extra Cassette for true size output material	1	1,950	360	1,950	360	1,800	3,750	840	840	4,200	3,894
SUB-TOTAL	10	\$521,005	\$54,720	\$522,205	\$54,960	\$274,800	\$ 797,005	\$197,160	\$197,880	\$ 989,400	\$ 860,773
TOTALS	14	\$761,955	\$78,000	\$763,155	\$78,240	\$391,200	\$1,154,355	\$277,440	\$278,160	\$1,390,800	\$1,243,011

FIGURE 4-33A
109

5 YEAR PERSONNEL (SALARY & BENEFITS) COSTS FOR CAMERA ORIGINAL COPY CREATION

Graphics Input Device									
DESCRIPTION	STRENGTH	GRADE	1 YR SALARY	1 YR BENEFITS	TOTAL 1 YR SALARY	TOTAL 1 YR BENEFITS	TOTAL 5 YRS SALARY	TOTAL 5 YRS BENEFITS	5 YR TOTAL SALARY/BENEFITS
Graphic Art Photocomposer Operator	1	GS 7/5	\$ 14,750	\$ 1,475	\$ 14,750	\$ 1,475	\$ 73,750	\$ 7,375	\$ 81,125
Camera Original Copy Creation Device									
Graphic Art Photocomposer Operator	1	GS 9/5	\$ 18,044	\$ 1,804	\$ 18,044	\$ 1,804	90,220	9,022	99,242
TOTALS	2		\$ 32,794	\$ 3,279	\$ 32,794	\$ 3,279	\$163,970	\$16,397	\$180,367

5 YEAR MATERIALS AND OVERHEAD COSTS FOR CAMERA ORIGINAL COPY CREATION

Graphic Input Device				
DESCRIPTION OF MATERIALS	QUANTITY	COST EACH	TOTAL 1 YR COST	TOTAL 5 YEAR COST
9-Track, 1600 BPI, 45 IPS Tape*	100	\$ 10	\$ 1,000	\$ 1,000
DESCRIPTION OF OVERHEAD				
Desks	1	\$ 158	\$ 158	\$ 158
Chairs	1	68	68	68
Supplemental Air Conditioners	1	1,500	1,500	7,500
TOTALS	103		\$ 2,726	\$ 8,726

Camera Original Copy Creation Device				
DESCRIPTION OF MATERIALS				
Recordak Dacomatic G Film 5469 (GSA Schedule)	16	\$ 63	\$ 1,008	\$ 5,040
DESCRIPTION OF OVERHEAD				
Desks	1	\$ 158	\$ 158	\$ 158
Chairs	1	68	68	68
Supplemental Air Conditioners	1	1,500	1,500	7,500
Fonts (3 styles)*				
Basic Character Complement	3	280	840	840
Option 2 - Special Characters	3	46	138	138
Special Characters	3	35	105	105
TOTALS	28		\$ 3,817	\$ 13,849

GRAND TOTALS	131		\$ 6,543	\$22,575
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* 9-Track tapes and fonts are initial year costs. 5 year costs same as first year.

5 YEAR FLOOR SPACE (SQUARE FOOTAGE) COSTS FOR CAMERA ORIGINAL COPY CREATION

GRAPHIC INPUT DEVICE						
EQUIPMENT/PERSONNEL REQUIRING FLOOR SPACE	QUANTITY	SPACE FOOTAGE EACH	COST PER SQUARE FOOT	SQUARE FOOT TOTAL	FLOOR SPACE COST 1 YEAR	FLOOR SPACE COST 5 YEARS
Illustration Scanner	1	159	\$ 8.64	157	\$ 1,356	\$ 6,780
Supplemental Air Conditioner	1	15	8.64	15	130	650
Personnel	1	60*	8.64	60	518	2,590
Sub-Total	3	232		232	\$ 2,004	\$10,020

CAMERA ORIGINAL COPY CREATION DEVICE

EQUIPMENT/PERSONNEL REQUIRING FLOOR SPACE	QUANTITY	SPACE FOOTAGE EACH	COST PER SQUARE FOOT	SQUARE FOOT TOTAL	FLOOR SPACE COST 1 YEAR	FLOOR SPACE COST 5 YEARS
Comp 80/2	1	200	\$ 8.64	200	\$ 1,728	\$ 8,640
Supplemental Air Conditioner	1	15	8.64	200	130	650
Personnel	1	60*	8.64	60	518	2,590
Sub-Total	3	275		275	\$ 2,376	\$11,880
TOTALS	6	507		507	\$ 4,380	\$21,900

*Personnel floor space equals 60 square feet/person. For the 2 Graphic Art Photocomposer Operators, 60 square feet/person includes 1 Graphic Art Photocomposer Operator console, 1 desk, 1 chair, and personal floor space.

The per page cost for this subsystem is \$0.65 in purchase situation, \$0.76 in a lease situation and \$0.69 in a lease/purchase situation assuming 425,000 camera original copy pages are created annually for five years.

(c) Not included as a materials cost was the difference between microfilm and paper. For each page of camera original paper generated as part of the 425,000 annual pages, \$0.14 must be added to the per page cost.

d. The total per page cost of the in-house electronic publications preparation system is \$12.35 in purchase situation, \$13.12 in a lease situation and \$12.59 in a lease/purchase situation provided throughput approximates 425,000 pages annually for five years.

4-3 CONTRACT SERVICES PUBLICATIONS PREPARATION.

a. The previous section dealt with an expansion/update of the IMPACT I proposed in-house publication preparation system. IMPACT I did not provide a comparative analysis, in-house vs services, possibly because equivalent services to meet their needs could not be found. During the course of this study, services for electronic publication preparation in support of a micropublishing requirement were found and used. These services used do not take exactly the same approach described for the in-house system; however, product produced is the same.

b. Publication design for automated data base publishing is the initial step in contract services publication preparation. It consists of designing overall publication style and format based on intended usage, developing paper and microfiche specifications, legibility testing, designing typographical layouts and specifying typographical details as computer parameters for automated publishing.

(1) Each type publication (AR, TB, TM, TOE, etc.) has a unique style/format; therefore, the publication design cost will vary according to degree of uniqueness or level of sophistication. Figure 2-15 lists 20 types of publications and the average cost of designing a publication for automated data base publishing is \$10,000. Assuming each type publication would be designed for automation the base cost would be \$200,000. In addition to this cost there is added a charge of \$250 for each new/additional unique copy block required (base cost includes 40 unique copy blocks for average cost stated). If each of the 1434 AR's after the first one required two additional copy blocks designed the cost would be \$717,000. This would bring the total publication design cost for all AR's and one of each other publication type to \$917,000. This figure will be used in

development of per page cost in a services situation.

c. Manuscript markup is the first operation that can be equated to a task found in the in-house publications preparation system. It consists of preparing the draft manuscript for data base input, and includes: marking the information value or content of copy elements (for example, identifying which elements are part number, description, distribution coded, etc.) for inclusion in the data base. Also includes: marking words or phrases within individual copy blocks that require special emphasis (such as bold, italic, underscore, small capitals, etc.). The current hourly rate for this operation is \$9.50. Assume 450,000 pages per year, 20 pages marked per hour. The per page cost is \$0.48.

d. Data base input (keystroking) consists of entering textual and tabular data in computer compatible format by manual keying. The process includes the following control steps:

(1) Keying of the data on to magnetic storage.

(2) Second keying (key verification) by a different individual which automatically compares, character by character, the material typed by the second individual with the material typed by the first individual. Any differences between the typed material cause a keyboard lock. Second typist then uses a CRT to insert the correct letter. The insertion also causes the line to be "flagged" so that it will be examined by a third person later in the process.

(3) Newly created data base is processed by an error detection program which checks for conditions such as missing footnotes, improper identification of information, etc. Detected errors are corrected before the data base is released.

(4) Manual proofing is not required using this input approach. The current rate per thousand characters based on 450,000 pages of 5,000 characters is \$1.85. The per page cost is \$9.25.

e. Graphics digitization (graphics input) consists of scanning photographs (to make halftones) or line art (to make line drawings) by a computerized device (3600 Illustration Scanner) and storing the resultant images in a magnetic data base suitable for subsequent computer manipulation and exposure on photocomposer pages paper or microfilm. Cost per page runs between \$5.00 and \$25.00 depending on type of illustration. Described system is for administrative type publications (no halftones), full page line art scanning cost per page is \$7.00 (39,000 pages per year).

f. Page make up consists of creating photocomposer "driver" tapes for paper and/or microfilm composers such as Videocomp 500, 570 and 800, COMP 80 and COMP 80/2, Linotron 1010, Photon, etc. Includes agency-owned equipment, GPO equipment, or contractor equipment. The drive tapes are formatted in the "base" language of the machine and are ready for processing by the machine without additional off-line data processing. Current cost of preparation is \$0.65 per thousand characters based on 450,000 pages of 5,000 characters annually. The per page cost is \$3.25.

g. Paper proof positives (original copy creation). Black and white page size positives on resin coated paper acceptance for proofing or camera ready copy for microfilm. Current cost is based on 489,000 pages annually, cost per page is \$0.80.

h. Costs:

\$917,000	Design.
\$20,812,500	Keying. 450,000 pages x 5 yrs (\$9.25 page).
\$1,080,000	Mark up. 450,000 pages x 5 yrs (\$0.48 page).
\$1,365,000	Graphics. 39,000 pages x 5 yrs (\$7.00 page).
\$7,312,500	Make up. 450,000 pages x 5 yrs (\$3.25 page).
\$1,956,000	Proofs. 489,000 pages x 5 yrs (\$0.80 page).
\$33,443,000	FIVE YEAR TOTAL
\$ 6,688,600	ONE YEAR COST

\$13.68 Per page cost based on 489,000 pages per year using described contract services electronic publications preparation system.

4-4 IN-HOUSE AND CONTRACT SERVICES PUBLICATIONS PREPARATION.

a. It is not necessary to rely solely on in-house or contract services to achieve total system compatibility for publications preparation. In-house operations and contract services can result in a lasting and cost effective approach to automated publications preparation provided there is a conscious courtship leading to consumation of a total system. Beginning the automation process of publications preparation early in the creation cycle assures the greatest degree of preparation flexibility and cost effectiveness for Army publications. However, proper standards for input must be defined and adhered to in order to make use of the created information data base as a

publishing data base.

b. Currently, one approach towards standard information data base creation (for publishing) widely accepted is the Information Standard Format (ISF). While the basic format is tightly structured it provides users with areas of flexibility which permit individual information management concepts to be developed without inhibiting the interchange of information. Design and creation of information data bases using unique/special or non-standard formats lead to procurements that are non-competitive or restrictive in nature. Using the ISF approach publications data base creation can be effected at the writing point and be revised and/or manipulated at any point in the preparation process. Additionally, an in-house, contract or mixed (in-house terminals with access to time sharing ADP services) approach can be utilized in capture process.

c. The Publications Directorate currently maintains, updates and causes formatted tapes to be generated for automated photocomposition of DA PAM's 310-1, -2, -3 and -4 via time shared ADP services. Actual photocomposition takes place at GPO, while input to the data base takes place within the Publications Directorate. The approach is forward thinking and in keeping with the dynamic nature of the publications indexes. This approach with variations could be used to automate any Army publication.

d. With a standard information data base creation process approach one can take advantage of government and commercial information transmission networks for the purpose of moving publication information between proponents and Publications Directorate for edit and composition markup. These same facilities can be used to transmit final marked up copy to a point where formatted composition tapes are created prior to creation of camera original copy or transmission to another location responsible for creation of camera originals.

e. Technology and services are available to effect the best (contract/in-house) approach (most cost effective) to Army publications preparation. Equipment that meets the specific needs of individual proponents and the Army publications process without locking into a single manufacturer or service can be acquired competitively based on defineable performance specifications.

CHAPTER 5

MICROPUBLISHING IMPLEMENTATION PLAN

5-1 GENERAL.

a. This chapter is in response to the requirement (primary objective) for development of a user oriented, implementation plan for the incremental conversion and Army-wide distribution of all applicable Department of Army publications in microfiche, using the most cost effective approach.

b. Within Army there are some 200 publication proponents responsible for over 50,000 publications of 20 different types. These proponents control the publications, and their major command or comparable unit has responsibility for supporting the initial publication production cost. The Adjutant General has responsibility for effecting publication production and distribution. Additionally, costs associated with stocking, reprints and resupply are borne by The Adjutant General. The above facts make for a complex publishing system in paper. Every publication or group of publications has a uniqueness to it that requires individual attention.

c. With micropublishing we are only implementing a change in the information carrier. Therefore, existing publication responsibilities (creation through distribution) including all budgetary aspects now associated with Army publications will remain the same. There is, of course, one change that will be forthcoming; a reduction in most budgeting requirements attributed to Army publications.

d. Micropublishing, while not new, is not a technology with a simple "cookbook" solution to publications creation, production, distribution and use. Publications identified as suitable for micropublishing must be created for production in microform, not converted from existing paper copies.

5-2 APPROACH.

a. While there is not a "cookbook" solution to producing a publication in microform, there does exist an approach, developed during the IMPACT II study, which has resulted in creation of quality micropublications that meet the needs of users. This proven approach consists of the following elements.

(1) Micropublication development - throughout the study report will be found reference to the creation of a publication as a micropublication. Chapter 3 covers techniques used to create publications in microform, all the processes use

microfilm, including those described in Chapter 4, Electronic Publications Preparation. However, we never refer to micropublishing as microfilming because they are not the same, anymore than printing and copying are the same. Microfilming and copying share the same degree of creativity, none! Printing and micropublishing on the other hand abound in creativity which is expressed through design. Proper design enhances the communication process associated with the printed word.

(a) Identifying a publication as a candidate is the first step in the development process. Early in the implementation the plan is to go after publications which are at least partly automated and contain little or no graphic information. As experience is gained, non-automated publications and those containing line art and graphics will be considered. Proponents will be encouraged to nominate candidates for micropublishing development.

(b) After identifying a potential candidate for micropublishing a further selection refinement takes place; after a review of distribution requirements and frequency of publication. Early implementation has attached to it the cost burden of viewers; therefore, the distribution frequency should be at least once each year, distribution quantity should be high and overlap to greatest degree with those publications already implemented as micropublications. The number of viewers required to implement any one publication should not exceed 25% of the distribution quantity of the publication.

(c) During the first two years of implementation of the micropublishing program it will be most important to determine the conditions under which a micropublication will be used. Presently, micropublishing must be limited to the office environment or other protected areas where power is available. It may well be two years before true portable or handheld viewers start to appear in any quantity sufficient to warrant micropublishing of field use publications. Additionally, the knowledge and experience of producing technical type publications, which are used in the field has yet to be developed using an electronic preparation process.

(d) Having come this far in the development process, it is now necessary to determine the economics associated with the candidate publication as they relate to its production in a paper mode. Cost development must include all items of expense from the writing through distribution. This is called the current system cost.

(e) With the paper system cost in hand, the costs associated with preparing the publication in microform must be determined

and compared to the current system cost. Development of the proposed approach (micropublishing) may require more than one set of costs due to the possibility of split mode publishing as an alternative, and different numbers of viewers required as a result of different levels of split mode publishing. Whatever approach is chosen, it must be cost effective over five years, using the economic process outlined in AR 340-22.

(f) This step of publications development is the actual conversion of the paper publication into a microform. Here it is necessary to review the publication content, take it apart and rebuild/design it as a micropublication, using one or more of the approaches/techniques described in Chapter 3. The output of this step is a prototype of the publication in microform. This prototype will be used for demonstration and test of usability.

(g) Design of the automated approach that will be used to effect actual production of a successful candidate publication is largely dependent on the content and quality (line printer versus graphic) desired in the publication. Though not all inclusive, possible approaches are described in Chapter 3. Initial automation in most cases will require a services or centralized assist. After system confidence is assured, the developed system can be imbedded at the proponent location. This will take place whether publication is produced in microform or remains in paper. The automation of publications preparation using a standard approach is the goal of this task.

(h) The last event in micropublications development is the formal presentation to the proponent the proposal to micropublish the candidate publication. Proponents may also wish to nominate additional publications.

(2) Test and acceptance - While micropublishing is not new to the Army, there are new functional areas which will be entered. Confidence must be built before implementation in order to reduce pitfalls and uncertainty. Gaining the proponent acceptance of a proposal to micropublish based on the micropublication development work is only the first step toward implementation. Test and acceptance of the publications development work will in many cases involve:

(a) Creation of sufficient copies of the developed publication in microform to perform a field test and shakedown to determine usability under live conditions.

(b) Additional work on the microform publication preparation approach taken during initial publication development may require rework based on field testing. As an example, the final FM 71-1 product described in Chapter 3 is the result of not one, but

several experiments. Additionally, while FM 71-1 is representative of a particular type of FM, it is not all encompassing of that type. Special situations will continue to require new solutions or reassessment of the approach.

(c) Testing of the proposed automated publication preparation process and flow. Implementation of automated publications preparation may involve using existing proponent text processing equipment or acquisition of new equipment. The most successful approach to test the automation development proposal appears to be one that uses the current paper publication as a test bed. After the current issue of the publication has been automated and passed through the system successfully, subsequent issues are merely revisions of an established data base that has been proven. Publication data base development on an unproven system results in unnecessary implementation delays due to false starts caused by not knowing the source of a problem.

(d) The final step of test and acceptance is gaining proponent approval to proceed with initial implementation of the candidate publication as a micropublished product. This may require agreement to publish one cycle of publication in parallel mode as a final test and confidence builder, or agreeing to some level of split mode publishing. Prior to moving into the initial implementation phase necessary viewing equipment requirements must be identified and the viewers placed.

(3) Initial implementation - After development and testing are complete and the publishing approach has been agreed to, the first cycle of the micropublished product can be implemented. This functional element includes:

(a) Implementing the electronic publications preparation process (data base creation and update).

(b) Production of original camera film from drive tape containing data, photocomposition commands and index requirements.

(c) Inspecting film (original and a duplicate) for compliance with minimum quality standards.

(d) Placing original film into the hands of the Publications Directorate for procurement and distribution of publication.

(4) Between distribution of first and second cycle of micropublication, monitoring of the usability and acceptability of the product will be undertaken. Input (comments) will be solicited from the users and changes implemented as necessary.

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(d) Placing original film into the hands of the Publications Directorate for procurement and distribution of publication.

(4) Between distribution of first and second cycle of micropublication, monitoring of the usability and acceptability of the product will be undertaken. Input (comments) will be solicited from the users and changes implemented as necessary.

In the case of a publication that is cycled two or more times in a year, the publication will be produced through the Micropublications Development Branch for at least two cycles prior to validation of the implementation.

(5) Operational release - This is the final step in implementation, or the first step under which all further responsibility for publication of the product is handled by the proponent, using the normal publications acquisition process.

(a) At this point, it is required that the publication automation approach be operational and acceptable. Publication processing documentation will be provided to proponent and Publications Directorate.

(b) The Publications Directorate will be required to assume responsibility for electronic data base publications processing and production to include: edit, mark up, layout and creation of camera original paper or microform. In addition to the above, the Publications Directorate will provide duplication/printing and distribution of products.

(c) The Micropublications Development Branch will provide, on request, technical assistance to proponents and the Publications Directorate personnel responsible for effecting operational micropublishing.

(6) Operation of this micropublishing implementation plan requires establishment of a branch to perform the functions outlined in the plan. They would have responsibility for providing the continuing micrographics management and technical expertise for Army's efforts in the field of micropublishing. Micropublications development and pre-operational work necessary to bring micropublishing to fruition in the Army is primarily micrographic in nature. Therefore, the group makeup must be heavy in micrographics technical competence and have a working knowledge of the Army publications system. Micropublications development and initial implementation will require development and design of specifications and acquisition of micrographic and related ADP services for automated micropublishing of products that will meet acceptable quality standards. Development of the automated publications preparation process will be evolutionary and incremental; progressing with the development of micropublished products. One of the first steps toward automation will be the lease of a text processing system capable of receiving, creating, modifying and transmitting a publications data base. This system will be used for automated micropublishing development, demonstration of automated process to proponents and initial implementation of micropublished products. Development of the automated publications preparation

process by the micropublications development group is logical. They will need the services of the system to perform the micropublications development functions prior to initial implementation.

5-3 SCHEDULE.

a. The formal schedule for implementation of micropublishing in the Army is for the most part a proposed approach. Micropublishing of any publication requires concurrence on the part of the proponent, and possibly the major commands affected by the implementation. The only sound approach to micropublishing is an incremental one. An increment may be one publication (AR 37-100-xx) or a complete publication series (DA PAM 310-). Others could be subsets of series (AR 340-18- and AR 340-21-) or groups of related publications (FM's and TM's used by riggers). Some increments will be small (5 to 20 publications); TOE's, CL's and CTA's will create increments of over 1,000.

b. A proposed user implementation plan must be based on the utility of microforms and the availability of suitable viewing devices to meet environmental needs. Publications, the use of which are office only, (DA PAM 310- and like) will be first, followed by supply and maintenance publications used under cover with power available. Field use of microform publications will be last and on a case-by-case evaluation.

c. Automation of the indexes (DA PAM 310-1, -2, -3, -4) and others can have a far reaching effect on the formal implementation of micropublishing in the Army. For that reason, we have pursued a course of action that is directly related toward the full automation of the 310 series, DA PAMS. Currently, the body of the indexes is an automation concern of the Publications Directorate. Working with the concurrence of Publications Directorate, we have begun automating the non-index portions of DA PAM 310-1 and 2. DA PAM 310-4, Index to Technical Publications, is the first index to be produced and distributed in microfiche (February 1979). Other DA PAM 310 series indexes will be follow on.

d. Publications development of Section I of the TOE's is complete. Implementation plan will be prepared for TOE's as second group of publications to be micropublished.

e. CTA's pose no problems to convert to micropublishing. Barring unforeseen problems in development, CTA's can be third increment of implementation.

f. The component list test in microform conducted by Catalog

Data Activity (CDA) has been completed. Results, findings and proposed future actions on this project are expected during 2nd quarter, FY 79. Should a recommendation for full implementation be proposed, this office will become deeply involved in planning and justifying the implementation approach and its associated cost/benefit analysis. The CL's represent a series of publications totaling over 1,000. The test prepared by CDA did not address indexing or any possible reformatting of the CL's, it was only a conversion from paper to microfilm. Prior to any implementation of this publication series in microform, the proponent must become involved in the design of the final product. Laboratory work performed under the direction of the study staff will impact heavily on any system design for this publication series and those publications with similar content (line art and computer generated information) and make-up. CL implementation in microform could require a 1-year lead time dependent on the degree of automation designed into the final system.

g. Prime candidates for micropublishing development include:

AR 340-18 Series	Proponent TAG/TAGCEN
AR 340-21 Series	Proponent TAG/TAGCEN
AR 55-60	Proponent Comptroller of the Army (COA)

h. Micropublishing interest has been indicated for:

AR 55-354	Proponent MTMC
AR 55-357	Proponent MTMC
AR 55-358	Proponent MTMC
AR 55-359	Proponent MTMC
AR 55-365	Proponent MTMC

i. Currently the only commitment to micropublish during 1979 is that made by the Publications Directorate, Office of The Adjutant General. Other publications mentioned are in development stage or proposed for development. Any publication can be effective as a micropublished product now, provided its use is limited to the office or an under cover environment. Most supply and administrative publications meet this requirement.

PROPOSED IMPLEMENTATION SCHEDULE

WEEKS

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52

/ TAG Approval

/ Establish Micropublishing Development Branch (1 Wk)

/ Implement TAG Approved IMPACT II Recommendations

/ Detail Micropublishing Development Branch Personnel (4 Wks)

/ Continue Micropublishing Development Efforts of IMPACT II Study Team

/ Rewrite Position Descriptions (4 Wks)

/ Micropublish DA PAM 18-1-1, DA PAM 310-4, TB 55-45

/ Announce Micropublishing Program (2 Wks)

/ Select and Lease Text Edit System for Automated Publications Preparation Development Work (9 Wks)

/ Prepare Contract Specification and Acquire Automated Publications Preparation Svc for DA PAM 310-1-2-3-5 and 99 (10 Wks)

/ Publications Development DA PAM 310-1-2-3-5 & -99 (4 Wks)

/ Publications Development CLs (8 Wks)

/ Prepare Contract Spec & Acquire Requirements Contract for Automated Pubs Preparation (18 Wks)

/ Publications Automation Development, AR 340-18 Series (18 Wks)

/ Prepare Contract Specifications & Acquire Requirements Contract for COM Produced Publications

/ Prepare Contract Spec & Acquire Requirements Contract for Source Document Micropubs (18 Wks)

/ Micropublish all New CLs

/ Micropublish DA PAM 310-1-2-3-5 & -99 (26 Wks)

/ Micropublish TOEs (30 Wks)

/ Micropublish AR 340-18 Series

/ Demonstrate Automated Publications Preparation System to Proponents

/ Publications Development CTAs (13 Weeks)

/ Publications Automation Development AR 55 Series (13 Wks)

/ Micropublish CTAs

/ Micropublish AR 55 Series

/ Text and Graphics Automated Merge Development

/ Re-examine In-house vs contract services (4 Wks)

*Operational Release Point

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6-1 GENERAL

a. The conclusions which follow are a consolidation of the findings in Chapters 2 through 5. Details are provided in those chapters. This chapter addresses conclusions by specific description within the general application of micropublishing in the Army. Recommendations are a further consolidation and refinement of specifically concluded positions in an effort to present direction for micropublishing in the Army.

6-2 CONCLUSIONS

a. The Army now has over 50,000 microfiche viewers in use. These are used in office or covered environments. 55,000 new microfiche viewers will be required when DA Pamphlets 310-1, -2, -3 and -4 and -5 are micropublished. A dual lens, 18X and 36X, 3/4 size viewer (Type II) as described in MIL-V-80240B will meet most functional requirements. The NSN is 6730-01-080-1188, Line Item Number (LIN) Y03820.

b. Viewers to support the micropublishing program should be acquired through the Defense General Supply Center (DGSC), Richmond, VA. This approach allows access to the MILSTRIP requisition process, helps maintain projected costs and provides individual unit acquisition of any quantity.

c. The only central funding apparently available to support initial viewer requirements (55,000) is through the Army Productivity Improvement Program. Category three of this program covers projects over \$900,000 and requires pay back within five years. The seven million dollar potential viewer investment can easily be paid back by printing and distribution savings derived from micropublishing.

d. The use of microfiche in the Army is wide-spread and a variety of micropublications are now in use. Micropublishing of administrative and supply publications would not impair the readiness posture of the Army.

e. Quality micropublishing cannot be produced unless publication fonts and point sizes now in use are changed/modified. Paper publications cannot be successfully converted directly (source document filming); they must be properly prepared for production in microform. Publications automation affords the opportunity to compose material in suitable form, for either paper or microform production.

f. Split-mode (paper and microfiche) publication situations are possible where cost effectiveness can be maintained if split-mode is carefully controlled. However, there is a cross-over point at which split-mode for any publication would result in greater cost than paper only. Therefore, split-mode publication should be avoided.

g. Because makeup, use and other aspects of each publication or group of publications is unique, micropublications development is necessary prior to micropublishing. Micropublishing will not just happen in the Army, it must be actively promoted and preliminary development work done if resistance to change is to be overcome.

h. Advance notice should be given of intent to micropublish particular publications; this notice should also provide instructions for requisitioning viewers. Point of contact should be provided to handle special situations and requirements.

i. Posting and updating of current publications as a result of change publications becomes a task of the past, if publications are automated. Cost effectiveness of micropublishing allows total replacement of publications at a fraction of the cost associated with a paper publication change.

j. Occasionally, paper prints from a microfiche are needed. Need will increase as micropublishing increases, but, should not be allowed to cause an uncontrolled proliferation of viewer-printers or high-speed-microfiche-to-paper copying machines.

k. The two Army publications distribution centers can make microfiche distribution without difficulty, provided microfiche publications are pre-packaged in envelopes. An ink jet labeling device has been tested and found suitable for addressing various quantities of microfiche in pre-packed mailing envelopes.

l. Publication distribution in microfiche is the single greatest area of savings documented. Using current distribution cost factors and rates microfiche is at least 55% less expensive for initial distribution and 90% less expensive during resupply when compared to distribution of publications in paper.

m. Microfiche duplication (printing) at the distribution centers is not an acceptable alternative to contract duplication. JCP approval is required for such large scale duplication and would be hard to justify since quality duplicate microfiche are readily available at competitive prices from commercial sources. However, duplication for resupply (demand printing) may be justified when sufficient numbers of publications have been

established as micropublications.

n. There are three criteria needed to implement a publication in microfiche:

(1) Usability of information in microform.

(2) Viewer availability.

(3) Viewing equipment costs offset by micropublishing savings.

o. Several alternative approaches to producing publications in microfiche are available. All use automated processes to effect increased productivity through reduction of manual workload processes. Development of individual or groups of publications as separate micropublishing applications will produce the most cost effective result. Original microfiche production approaches vary insofar as cost is concerned by as much as 400:1.

p. An in-house micropublishing system is cost justified on the basis of economics; however, it assumes a throughput per annum of over 425,000 pages. Contract services micropublishing is estimated at \$1.00 more per original copy page created than in-house micropublishing; however, it does not carry a requirement to produce a fixed number of pages per year.

6-3 RECOMMENDATIONS

a. That a group be established (initially as a branch) and given the responsibility of carrying out micropublication development, including automation, test and acceptance, initial implementation, validation and operational release functions described in the micropublishing implementation plan.

b. That contract services be used for automated micropublications preparation and micropublishing until such time as the necessary automated micropublishing base has been established.

c. That automated publications preparation be undertaken using the Information Standard Format (ISF) approach as a means of developing the publications data base.

d. That the necessary microfiche viewers be acquired through the Defense General Supply Center (DGSC), regardless of funding approach.

e. That an effort be undertaken to secure funds for

microfiche viewers under the provisions of the Army Productivity Improvement Program.

f. That acquisition of microfiche viewer-printers (MACOM controlled) and microfiche-to-paper-copiers (DAAG controlled) be limited to essential requirements.

g. That all micropublications duplication meet the duplication specification contained in this report and be acquired through contract services until such time as a sufficient micropublications base can justify resupply (demand distribution) duplication at the distribution centers.

h. That distribution of all Army micropublications be performed by the distribution centers.

APPENDIX A

COPY OF HQ USADARCOM LETTER

AMCSU-L

31 January 1974

SUBJECT: Information Bulletin on 48X Microfiche Equipment

1. Inquiries on repair, servicing, and replacement of 48X Microfiche Equipment indicates a requirement for dissemination of the following:

a. Problems with Wollensak Viewers, FSN 6730-074-2729. This information is furnished due to liquidation of the Wollensak Company, and therefore, the inability to obtain repair services and parts.

(1) Prepare and forward an Unsatisfactory Equipment Report (UER), Standard Form 364, to Defense General Supply Center, ATTN: DGSC-SQ, Richmond, VA 23212.

(2) Retain the inoperative machine for cannibalization purposes. Parts are to be used for repair of other Wollensak viewers on hand.

(3) If only one viewer is on hand, offer the inoperative viewer to another unit using the same type of equipment within or outside your organization for cannibalization. If this action cannot be economically effected, excess the inoperative viewer.

(4) Requisition another viewer.

b. Problems with Micro Design Viewer, FSN 6730-074-2729, and Washington Scientific Industries Inc Viewers FSN 6730-074-2729 (one year warranty). Prepare and forward an Unsatisfactory Equipment Report (UER), Standard Form 364, to Defense General Supply Center, ATTN: DGSC-SQ, Richmond, VA 23212. DGSC, upon receipt of the UER, will effect action for repair, or inform you accordingly.

c. Problems with 3M Viewer Printers, FSN 6730-044-3242 (five year support program).

(1) CONUS: Contact the 3M Distributor in your area; they will set up newly acquired equipment, train your employees on equipment operation, and send service personnel to repair inoperative equipment.

(2) OCONUS: Prepare and forward an Unsatisfactory Equipment Report (UER), Standard Form 364, to Defense General Supply Center, ATTN: DGSC-SQ, Richmond, VA 23212. DGSC, upon receipt of the UER, will effect action for repair or inform you accordingly.

2. The Defense General Supply Center (DGSC) advises that procurement on FSNs 6730-165-7171 (Viewer), and 6730-044-9283 (Viewer Printer) has been cancelled, and that no support will be provided as these items have been classified non-standard. All customers requiring Viewers or Viewer Printers with other than 115V capabilities are advised to submit requisitions for FSNs 6730-116-1618 (Viewer) or 6730-116-1620 (Viewer Printer). Both FSNs have Dual Lens 24X-48X, Dual Voltage 115/230V±5 and availability on these FSNs is expected in mid 1974.

3. Problems or delays in delivery of equipment should be addressed to Mrs. Moore or Mr. Martin, DGSC, AUTOVON 695-4330 or 695-4613.

4. The following publications, distributed with each microfiche viewer and viewer printer when they are delivered to the requisitioner, provide operation and maintenance instructions for the viewing equipment;

a. TM-DGSC-6730-1 (Viewer/Printer)

b. TM-DGSC-6730-2 (Viewer)

Requests for copies of the TMs should be submitted directly to the manufacturer of the viewing equipment.

5. AMXCA-D Form 901, distributed with the initial ARMS Monthly AMDF on microfiche, provides information on how to read the title areas, use the index, handle and clean the microfiche. Copies of Form 901 may be obtained from the US Army Catalog Data Agency, ATTN: AMXCA-CP, New Cumberland Army Depot, New Cumberland, PA 17070.

6. Do not hesitate to contact US Army Catalog Data Agency, New Cumberland Army Depot, New Cumberland, PA 17070, ATTN: AMXCA-CP (Mr. D. Jones), AUTOVON: 977-6608 or 977-6741, if they can be of any assistance.

/s/
ARTHUR I. SAGER
Chief, Logistics Data
Management Division
Directorate for Supply

U. S. GOVERNMENT PRINTING OFFICE
Washington, D.C.

GENERAL TERMS, CONDITIONS, AND SPECIFICATIONS

FOR THE PROCUREMENT OF

DUPLICATE MICROFICHE - ARMY PUBLICATIONS

during the period beginning

December 1, 1978, and ending September 30, 1979

As requisitioned from the Government Printing Office by the
DEPARTMENT OF ARMY

PRODUCTION AREA: It is assumed that all production facilities used in the manufacture of the product(s) ordered under this contract will be located within a 125-mile radius of zero milestone, Washington, D.C.

Any bidder intending to use production facilities outside of this area must furnish documentation, with his bid, which will on its face demonstrate his ability to meet the schedule requirements. The determination by the Government of the acceptability of this information in no way relieves the successful bidder of the responsibility for compliance with these schedule requirements.

Bidders are cautioned to familiarize themselves with the requirements of this contract before bidding: special attention is directed to the preaward conditions of this contract with respect to clean air environment in contractor's facility, in paragraph 2.13-12 and printing in paragraph 2.14.

SECTION 1.- GENERAL TERMS AND CONDITIONS

1.1. PRODUCTION CONTROL PROCEDURE.- Bidder agrees that if awarded a contract for this program, he will establish:

(a) A dependable system for controlling the progress of each order through all production operations (including those of any subcontractor) in order to comply with the requirements set forth in the "Notice of Compliance with Schedules".

(b) An inspection procedure for each production operation to maintain the required quality of workmanship and materials.

(c) The Government Printing Office may require the bidder to submit and guarantee a detailed plan of his control system and inspection procedure for approval and acceptance.

1.2. CONTRACT TERMS NO. 1.- In accepting this contract, the contractor specifically agrees to all the terms of GPO Form 198, U.S. Government Printing Office Contract Terms No. 1, approved July 1, 1943 (Rev. 7-15-70), which is hereby made a part of this contract, provided such terms are not otherwise covered herein.

1.3. RENEWAL.- Any contract resulting from the offering of these specifications will be subject to renewal for such period of time as may be mutually agreeable to the U.S. Government Printing Office and the contractor.

1.4. CANCELLATION.- The Government Printing Office reserves the right to cancel this contract at any time without prior notice.

1.5. AUTHORIZATION FOR ADDITIONAL PERFORMANCE.- When so directed, the contractor will work in conjunction with representatives of the agency, other than the Government Printing Office named above, in matters relating to arranging details of schedule, etc., provided that any instructions received or arrangements made do not conflict with or tend to alter or amend the terms of this contract in any particular. The contractor is therefore cautioned not to perform any work not provided for in the specifications without previous authorization in writing from the Government Printing Office.

1.6. IMPRINTS.- The contractor's imprint or other identity must not appear on the publications or the packing envelope.

1.7. ASSIGNMENT OF JACKETS, PURCHASE AND MEMORANDUM ORDERS.- A Government Printing Office jacket number will be assigned

and a purchase order issued to the contractor to cover work performed. The purchase order may be supplemented by an individual "Memorandum Order and Supplementary Specifications", hereinafter termed "print order", for each job placed with the contractor. The print order, when issued, will indicate the quantity to be produced and any other information pertinent to the particular issue.

1.8. PAYMENT.-

- (a) All vouchers must be submitted to the -
 U.S. Government Printing Office
 Financial Management Service
 Comptroller: FME
 Washington, D.C. 20401

- (b) Payment will be made on the basis of the actual number of units of each operation as described in the specifications and at the prices quoted therefor. The voucher (Form SF 1034, furnished by the Government Printing Office) must be prepared by the contractor in quadruplicate as an itemized statement showing a breakdown of all operations performed. The contractor MUST in all cases furnish evidence of work performed in order for charges on the voucher to be allowed.

- (c) Specific reference is made to Articles 14 and 16 through 25 of GPO Form 198, U.S. Government Printing Office Contract Terms No. 1, and Attachment "B" (Payments) hereinafter.

1.9 . WORKMANSHIP.-

- (a) All workmanship in connection with the microfiche manufactured under these specifications must be first class in every respect.

- (b) It will be the contractor's responsibility to inspect the camera originals or printing masters furnished by the Government as he sees fit, in order to determine their suitability for production of duplicate copies meeting the requirements of these specifications. See paragraph 2.11. "Acceptance".

- (c) The Public Printer reserves the right to be the sole judge as to the quality of workmanship in any article or product delivered under these specifications.

Duplicate Microfiche - Army Publications

1.10. SPECIAL NOTICE OF CAUTION TO BIDDERS.-

(a) These are scheduled jobs which allow a maximum of 15 calendar days for production. The contractor MUST maintain the schedules provided in this contract and on the print order.

(b) If the contractor refuses or fails to make shipments on an order within the time specified, or any extension thereof, the Government may, by written notice, terminate the right of the contractor to proceed with shipments or such part or parts thereof where there has been a delay. In such event, the Government may purchase the required services, materials, or supplies in the open market or secure the services, materials, or supplies by contract or otherwise, and the contractor and his sureties shall be liable to the Government for any excess cost occasioned thereby: Provided, That the contractor shall not be charged for any excess cost occasioned by unforeseeable causes beyond the control and without the fault or negligence of the contractor, including, but not restricted to, acts of God or the public enemy, acts of the Government, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather, and delays of a subcontractor due to such causes unless the contracting officer shall determine that the services, materials, or supplies to be furnished under the subcontract were obtainable from other sources in sufficient time to permit the contractor to meet the required shipping schedule: Provided, further, That the contractor shall, within 10 calendar days from the beginning of any such delay, notify the contracting officer by telephone of the causes of delay. This notification will be confirmed in writing.

(c) In the event a delay is caused by any action of the Government, and the contractor cannot meet the original schedule, then the schedule may be extended by the number of calendar days that work was delayed.

1.11. EMPLOYMENT.- Reference is made to Attachments "A" and "C" hereinafter.

1.12. NOTICE OF COMPLIANCE WITH SCHEDULES.-

(a) In order to successfully and adequately maintain progress records, the U.S. Government Printing Office must have certain information concerning deliveries which only the contractor can provide.

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(b) The contractor, therefore, must furnish the information required in accordance with the procedure outlined below:

(1) If on the date established in the specifications for the receipt of material (such as copy, negatives, paper, etc.) by the contractor, he has not received the material(s), he shall telephone the Government Printing Office and so inform the GPO Compliance Section.

(2) If proofs are required, the contractor shall telephone, on the day the proofs are sent and inform the Government Printing Office that proofs have been forwarded and the method used (i.e., certified mail, etc.) for delivery.

(3) In the event shipment(s) has not been made on the scheduled date, the contractor shall telephone the Government Printing Office immediately, inform the GPO that the shipment(s) has not been made, state his reason for not making the delivery as scheduled, and state a tentative date on which shipment(s) will be made.

(4) On the date on which the contractor makes shipment(s), the contractor shall telephone between the hour of 8:00 a.m. and 4:30 p.m., prevailing Washington, D.C. time, and inform the Government Printing Office that he has made shipment(s), giving the name of the carrier(s) or trucker(s).

(c) Toll free WATS lines are available for use in making the above progress reports. For long distance calls, the number to use is 800-424-9470. For metropolitan Washington, D.C. area calls, the number to use is 275-2536. THESE LINES ARE TO BE USED FOR THEIR INTENDED USE ONLY. The personnel that will be answering these calls do not have the expertise to respond to questions of a technical nature. Since the lines do not come through the GPO switchboard, calls can not be transferred to other areas of the Office.

Duplicate Microfiche - Army Publications

SECTION 2.- SPECIFICATIONS

2.1. SCOPE.- These specifications cover the production of duplicate microfiche from furnished camera original or printing master microfiche produced on COM or source document camera devices, including any necessary intermediate fiche, gathering into sets, printing of envelopes, packing, and delivery. The duplicate fiche produced must be suitable for use in microfiche viewing and printing equipment.

2.2. TITLE.- Duplicate Microfiche - Army Publications.

2.3. PREAWARD CONFERENCE.- Because of the stringent requirements of the ordering agency, the Government Printing Office reserves the right to require a preaward conference with representatives of the low bidder, the ordering agency, and the Government Printing Office. If a conference is required, the bidder will be furnished a set of camera originals or printing masters as described under paragraph 2.7. "Material Furnished by the Government", and he will be required to produce at that time a sufficient number of duplicates of each original or master and envelope that will demonstrate his ability to perform within the requirements of this contract. The bidder shall make available all reasonable facilities, equipment, and assistance for the required tests. Preaward conference will be held at the facility at which the duplicate microfiche will be manufactured.

2.4. FREQUENCY OF ORDERS.- No guarantee can be given; however, the following requirements are anticipated: Sixteen orders per year.

2.5. QUANTITIES.-

- 108,500 sets of one fiche (four issues)
- 77,500 sets of one fiche (four issues)
- 73,150 sets of one fiche (four issues)
- 61,800 sets of two fiche (four issues)

2.6. APPLICABLE DOCUMENTS.-

(a) These specifications are based on the requirements of Military Specification MIL-F-80242, MIL-M-38748A and MIL-STD-399A, copies of which may not be available to contractors at time of bidding. All applicable requirements of the military specifications have been incorporated into this contract.

Duplicate Microfiche - Army Publications

(b) The following documents, including any amendments thereto, and any applicable documents quoted therein, of the issue in effect on the date of invitation for bids, form a part of this contract to the extent specified herein. In case of conflict this specification shall hold precedence.

(1) Military Standard -

MIL-STD-105	Sampling Procedures and Tables for
	Inspection by Attributes
MIL-STD-399A	Microform Formats

(2) Federal Specifications -

L-F-315	Film, Direct Positive, Roll (Diaz
	Type)
PPP-B-636h	Box, Fiberboard

(3) American National Standards Institute Publications -

PH1.25	Safety Photographic Film, Specifica-
	tions for
PH2.19	Diffuse Transmission Density

(c) Single copies of Federal specifications are available to bidders on this contract free of charge at the Business Service Centers of the General Services Administration Regional Offices in Boston, Mass., New York, N.Y., Philadelphia, Pa., Atlanta, Ga., Chicago, Ill., Kansas City, Mo., Fort Worth, Tex., Denver, Colo., San Francisco, Cal., Los Angeles, Cal., Auburn, Wash., Seattle, Wash., and Washington, D.C.

(d) ANSI Standards may be obtained from the American National Standards Institute, Inc., 1430 Broadway, New York, N.Y. 10018.

2.7. MATERIAL FURNISHED BY THE GOVERNMENT.- The following material will be furnished with each print order:

(a) At least one complete set of microfiche camera originals or printing masters in cut form, Type I, Class 1 or class 2, Kind N or P. The originals will be produced on COM or source document camera equipment, and may be 24:1 or 48:1 reduction ratio.

(b) One piece of camera copy for printing envelopes.

Duplicate Microfiche - Army Publications

2.8. RETURN OF MATERIAL FURNISHED.- Furnished masters are to be returned to the originating address within 10 working days after complete production of each order. Packages containing furnished masters shall be conspicuously labeled "Avoid finger marking or mishandling of enclosed master film".

2.9. LIABILITY FOR GOVERNMENT-OWNED PROPERTY.- The contractor will be held liable for the cost of replacing lost or damaged Government property, whether in the course of operations or in transit upon return of such furnished property to the Government.

2.10. CONTRACTOR TO FURNISH.- The contractor will be required to supply all materials and services, other than those listed under paragraph 2.7 "Material Furnished by the Government", necessary for the complete manufacture, packing, and mailing of the products covered by these specifications, including any intermediate copy film his production method requires.

2.11. ACCEPTANCE.- It will be the contractor's responsibility to inspect the masters furnished by the Government in order to determine their acceptability for satisfactory production of duplicate copies meeting the requirements of these specifications. If the contractor determines that the furnished masters are not acceptable he must inform the designated Government representative (see paragraph 2.19-1) by telephone within 24 hours of receipt of the masters and suspend production pending further instructions. If such notification is not received by the Government the furnished masters shall be deemed to be of suitable quality for production of duplicate copies meeting the requirements specified herein.

2.12. REQUIREMENTS.-

(a) From the masters furnished, the contractor shall produce the required number of duplicate sets of distribution copy cut fiche. The film shall be Type II (diaz), Kind N.

(b) The produced duplicate fiche must be suitable for the use and in accordance with the requirements specified herein.

(c) All microfiche produced under this contract shall conform to the applicable requirements of the publications listed under paragraph 2.6 "Applicable Documents", and shall be in a one-for-one facsimile of the master, as follows:

Duplicate Microfiche - Army Publications

2.12-1. Materials.- All film produced under this contract shall be made of safety stock as defined by ANSI Standard PH1.25. The diazo film used shall be Type II in accordance with Federal Specification L-F-315 (except for size).

2.12-2. Fiche Size and Thickness.- The overall dimensions of the distribution copy fiche shall be $105.0 \pm 0.0 - 0.75$ mm x $148.0 \pm 0.0 - 1.0$ mm. The thickness of films used may vary from 0.004" to 0.008".

2.12-3. Squareness.- Each side of the microfiche shall be perpendicular to the bottom (reference) edge of the fiche within ± 0.13 mm for each 25.0 mm of height. Total deviation from the perpendicular shall not cause the length of the top edge to exceed $148.0 \pm 1.0 - 1.0$ mm.

2.12-4. Image Position.- The overall image shall be positioned 4.0 ± 0.5 mm from the bottom (reference) edge of the fiche and 4.0 ± 0.5 mm from the left edge of the fiche.

2.12-5. Notches.- There shall be no notches.

2.12-6. Protective Coating.- There shall be no protective coating.

2.12-7. Title Backing.- There shall be no title backing or stripe.

2.12-8. Identification.- The contractor's firm name, trademark, or any form of advertising shall not appear on any portion of the microfiche or packing envelope.

2.12-9. Density.- All densities mentioned in this specification are gross densities. The density measuring techniques and acceptable densities of distribution copy microfiche shall be as measured by the method described in ANSI Standard PH2.19 as follows:

Type II (diazo)

Class 2 - First reproduction microfiche made from
Class 1 COM microfiche. D max. 1.50 min.,
D min. 0.10 max.

Class 3 - Second reproduction microfiche made from
Class 2 COM microfiche. D max. 1.40 min.,
D min. 0.20 max.

Class 2 - First reproduction microfiche made from
Class 1 source document microfiche.
D max. 1.1 to 1.2, D min. 0.06 max.

Class 3 - Second reproduction microfiche made from
Class 2 source document microfiche.
D max. 1.0 to 1.3, D min. 0.10 max.

The above densities are provided as aiming points. The primary consideration in determining acceptable quality

Duplicate Microfiche - Army Publications

of distribution copies shall be legibility. All information must be legible when displayed on a viewer providing a magnification equal to 75% of the reduction or effective reduction ratio used to create original microform.

2.12-10. Curl and Bow. - When film is tested as specified in paragraph 2.13-11, the curl or bow of a sheet of distribution copy fiche shall have no part more than 0.25" above a flat surface.

2.12-11. Technical Quality of Fiche. - Distribution copy fiche shall be of sufficient quality to produce a paper print in accordance with reproducibility test in paragraph 2.13-10.

2.12-12. Workmanship. - All fiche produced in accordance with this specification shall be free from scratches, holes, tears, finger marks, or any other defects that might adversely affect the use and/or quality of subsequent reproductions.

2.12-13. Clean Air Environment. - The contractor must maintain a clean air environment in the microduplicating area sufficient to prevent the presence of dust particles that could cause defects in the duplicate fiche. In order to achieve an acceptable clean air environment, air filtration equipment of the type normally used in the production of high-reduction microfiche is an absolute necessity.

2.13. QUALITY ASSURANCE PROVISIONS. -

2.13-1. Responsibility for Inspection. - Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all test and inspection requirements as specified herein. The Government reserves the right to make periodic visits to the contractor's manufacturing facility, during normal working hours, for the purpose of assuring compliance with the quality provisions of these specifications; the contractor does hereby agree to make available to the Government (or a designated representative), all records, equipment, and/or procedures required by said quality provisions. The Government also reserves the right to perform any of the tests and inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

Duplicate Microfiche - Army Publications

2.13-2. First Article Inspection.-

(a) The first article shall consist of three samples selected from a preproduction run of 100 fiche of the same classification and information, or 10 fiche sets of the same information as applicable in accordance with the following procedure:

- 1 sample from the beginning of the run.
- 1 sample from the middle of the run.
- 1 sample from the last part of the run.

(b) The samples shall be examined for defects listed in paragraph 2.13-7, and inspected and tested in accordance with all the applicable requirements of the specifications. Failure to pass any tests or a major defect in paragraph 2.13-7. shall be cause for rejection of the preproduction sample.

2.13-3. Sampling for Inspection and Acceptance.- Unless otherwise specified, sampling for inspection and acceptance shall be performed in accordance with the provisions set forth in MIL-STD-105. The manufacturer's sampling for inspection and acceptance procedures may be utilized, providing such sampling for inspection and acceptance methods will assure quality equal to or better than that obtained by following the provisions set forth in MIL-STD-105, and provided the manufacturer's methods have been approved by the procuring activity.

2.13-4. Inspection of Materials and Components.- The supplier is responsible for insuring that materials and components used were manufactured, tested, and inspected in accordance with the requirements of referenced subsidiary specifications and standards to the extent specified, or, if none, in accordance with this specification. In the event of conflict, this specification shall govern. The manufacturer's test methods may be utilized, provided such test methods will assure results equal to or better than that obtained by those test methods specified herein, and provided the manufacturer's test methods are approved by the procuring activity.

2.13-5. End Item Inspection.- The inspection lot shall consist of all the production distribution copy fiche produced to fulfill this order. A sampling unit shall consist of all frames within the fiche (up to 420). A sample shall consist of up to four percent of the total lot submitted for inspection.

Duplicate Microfiche - Army Publications

2.13-6. Visual Examination.- Examination shall be made of the fiche or fiche sets, as applicable, for defects listed in paragraph 2.13-7. Examination shall be performed at magnification from 20X to 48X. All defects shall be verified with at least 48X magnification. The inspection level shall be level II with an AQL of 2.5 major defects expressed in terms of defects per hundred units.

2.13-7. Classification of Major Visual Defects.-

(a) Characters or symbols in title area are filled in or light to the extent they are illegible.

(b) Microimages obscured, illegible, or out of focus.

(c) Blisters, tears, or processing stains are on fiche.

(d) Scratches are touching or through microimages.

(e) Foreign material is in grid area obliterating, obscuring, or defacing microimages.

(f) Microimage placement and orientation not as specified.

2.13-8. Dimensional Examination.- An examination shall be made of the end item to determine compliance with dimensions specified. Any nonconformance shall constitute a defect. The inspection level shall be S-2 with an AQL of 4.0 defects, expressed in terms of defects per hundred units.

2.13-9. Testing of the End Item.- Testing of the end item shall be conducted on each lot processed and submitted for acceptance. The sample unit shall be one fiche or complete fiche set, as applicable.

2.13-10. Reproducibility Test.- Two successive microimages shall be selected at random on the sample fiche. Paper prints shall be made using an enlargement ratio of 100 to 75% of the original reduction ratio used. The two prints shall be examined for legibility. If either print is not legible, the entire lot shall be rejected.

2.13-11. Curl and Bow.- The distribution fiche shall meet requirements of paragraph 2.12-11 when placed convex side down, on a flat surface for at least six hours in an atmosphere of 70 degrees Fahrenheit and a 50 percent relative humidity. Inspection level shall be S-4 and AQL 4.0.

Duplicate Microfiche - Army Publications

2.13-12. Production Facility Environment. - The Government Printing Office reserves the right to undertake air sampling particle counts, particle size and distribution tests of the operating environment prior to award of contract. These air sampling tests will be conducted in accordance with Federal Standard No. 209b, and must meet the minimum requirements for Class 10,000 (particle count not to exceed 10,000 particles per cubic foot of a size 0.5 micron and larger, or 65 particles per cubic foot of a size 5.0 microns and larger). Commercial standard air filtration equipment, standards and techniques of a kind or type peculiar to film handling laboratories shall be an environmental quality control requirement of this contract to minimize the possibility of image contamination through particulate matter.

Duplicate Microfiche - Army Publications

2.13-13. Certification.- Certification of all tests performed in accordance with this section shall be submitted to the procuring activity on a contractor's form similar to that reproduced below and in accordance with contractual requirements.

<u>CONTRACTOR'S CERTIFICATE</u>			
I hereby certify that the fiche included in this shipment have been inspected and approved as meeting the quality assurance provisions indicated below and all other requirements of this contract.			
CONTRACTOR _____	CONTRACT NUMBER _____		
INSPECTION LOT NUMBER _____	NUMBER OF FICHE IN LOT _____		
GOVERNMENT AGENCY _____	DATE OF SUBMITTAL _____		
	Check		Insert reading
MASTER	<input type="checkbox"/>	RESOLUTION L/mm	_____
INTERMEDIATE	<input type="checkbox"/>	HYPO RESIDUAL TEST	_____
DISTRIBUTION	<input type="checkbox"/>	REDUCTION RATIO	_____
SILVER	<input type="checkbox"/>	Hi Lo Lot average reading	_____
DIAZO	<input type="checkbox"/>	D. MAX	_____
VESICULAR	<input type="checkbox"/>	D. MIN	_____
TITLE	<input type="checkbox"/>	SIGNATURE	_____
INDEXING	<input type="checkbox"/>	TITLE	_____

2.13-14. Inspection Equipment and Facilities.- Inspection equipment and facilities shall be of sufficient accuracy, quality, and quantity to permit performance of the required acceptance inspections.

2.13-15. Contractor's Records.- The contractor shall save and preserve all records of quality assurance inspections for a minimum of 90 days after final delivery.

2.14. PRINTING.- Contractor will be required to print the packing envelopes. Camera-ready copy will be furnished with each order placed.

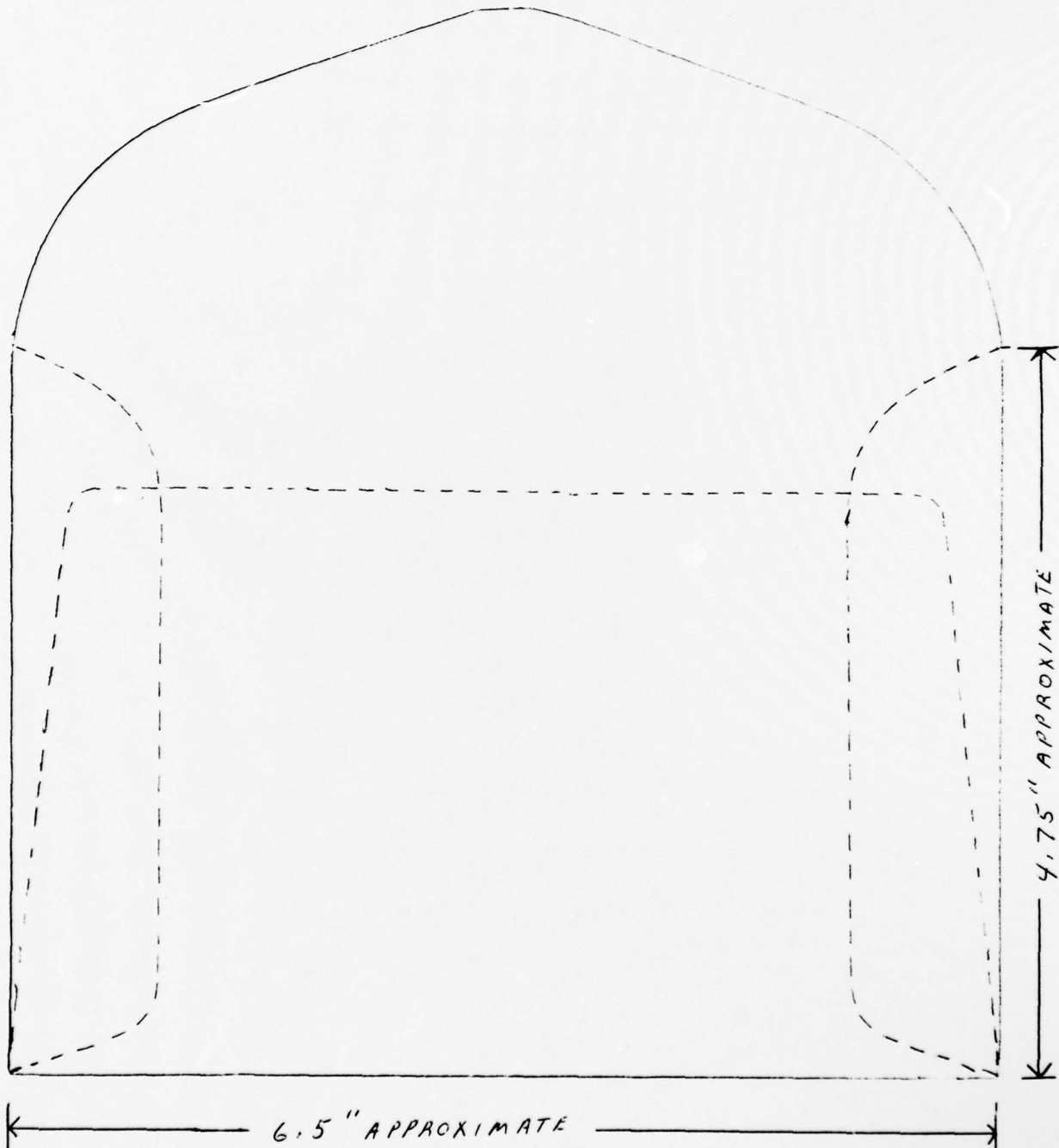
Duplicate Microfiche - Army Publications

2.14-1. Envelope Specification.-

- (a) Stock. Bleached Kraft, white, Sub 32 (Basis 17x22" - 500 sheets).
Alternate - Unbleached Kraft, Sub 32 (Basis 17x22" - 500 sheets).
- (b) Printing. Face side of envelope in black ink.
- (c) Copy. One piece of camera copy furnished.
- (d) Size. 4.75" x 6.5" (approximate) See facsimile of envelope on page 16.
- (e) Quantity. One for each set of fiche.

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FACSIMILE OF PACKING ENVELOPE



B-16

Duplicate Microfiche - Army Publications

2.15. COLLATING.- Each set of fiche shall be collated in normal sheet number sequence.

2.16. PACKING.-

2.16-1. Interior Packing.- Sets will be placed in close - fitting preprinted envelopes (see envelope specification, paragraph 2.14) with adhesive closure, sealed.

2.16-2. Exterior Packing.-

(a) Collective sets of fiche shall be packed for shipment with substantial packing material to insure safe arrival at destination. All shipments must be packed in containers, as follows: Shipping Containers: New corrugated or solid fiberboard, bearing no inscription or advertising other than the manufacturer's certificate; style RSC; minimum bursting strength 275 p.s.i.; with lapped body joint; manufactured in complete accordance with the current Federal Specification PPP-B-636h, and any amendments thereto. Filled weight of containers must not exceed 40 pounds.

(b) Packing and Sealing Shipping Containers.- Shipping containers must be packed solidly, with the material laid flat on the bottom of the container (never stand on end) and in solid contact with the top and bottom of the container, to prevent shifting and crushing in shipping and storage operations. "Open-cell pads" or thicknesses of corrugated board must be added to insure stability whenever the material does not fit the container snugly. Top and bottom pads of corrugated fiberboard shall be used. Top and bottom flaps must be closed and fastened firmly with water - resistant adhesive suitable for the purpose. Adhesive must be applied over not less than 50% of the area of contact between the inner and outer flaps. The bottom flaps may be stapled instead of sealed, provided this is done before the container is packed.

(c) At contractor's option, containers may be sealed with tape which must completely cover the butted edges of the flaps and extend at least 2" on the ends of the containers. Tape may be either:

(1) A minimum 3" wide Class 2, Type I asphaltic or Type II nonasphaltic, glass or sisal filament reinforced tape that conforms to Federal Specification PPP-T-45C, and any amendments thereto, or -

(2) A minimum 2" wide Class 1, Type III waterproof, pressure-sensitive adhesive tape that conforms to Federal Specification PPP-T-0060D, and any amendments thereto.

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(d) All packaging operations and materials must be such as to guarantee protection of the film during shipment and to provide safe delivery to its destination. Any packaging material used shall contain no adhesive or chemical content that may produce a degenerative effect upon the film.

2.16-3. Examination of Preparation for Delivery.-

(a) An examination shall be made to determine that preservation, packaging, and packing and marking as required by this specification are complied with. Defects shall be as indicated in paragraph 2.16-5(b). The sample unit shall be shipping container fully prepared for delivery. The lot shall be the number of containers offered for inspection at one time. The inspection level shall be S-4 with an AQL of 6.5 defects expressed in terms of defects per hundred units.

(b) <u>Examine</u>	<u>Defects</u>
Packing	Not packed as specified. Packing material not specified; closures not accomplished by specified or required methods or materials. Number of fiche or fiche sets, per container less than indicated.
Marking (exterior)	Labels not properly attached. Labels or marking illegible, incorrect, incomplete, or not in accordance with contract requirements.
Weight	Gross or net weight exceeds contract requirements.

2.17. DELIVERY.- Deliver F.O.B. destination.

(a) Deliveries to the department of Army are to be made to the following address.

Transportation Officer
US Army AG Publications Center
2800 Eastern Boulevard
Bengies, MD

CAUTION: THIS IS NOT A MAILING ADDRESS

(b) All shipments to the Department of Army must be in a single shipment to the specified address.

(c) Truck deliveries to the Department of Army Publication Distribution Center must be complete shipments to that address, received between 8:00 a.m. and 3:15 p.m. local time and tailgated by the carrier unless the rear door has a minimum height opening of 80 inches.

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(d) All consignments must be full count. Shortages occurring in consignments may be cause for requiring the contractor to make up such shortages at no additional cost to the Government.

2.18. INSPECTION SAMPLES.-

(a) The first set for each order, as soon as completed, must be sent by air mail for inspection to:

U.S. Government Printing Office
Central Office Printing Procurement
Division - PPC
Room A 843
Washington, D.C. 20401
Attn: "Inspection Samples"

(b) These microfiche shall be considered as "samples" and cannot be deducted from the total quantity ordered.

(c) When submitting inspection samples, the package or envelope containing these samples must be identified by the program number and title, the GPO jacket and print order numbers; and must include a copy (Xerox or similar) of the print order on which these samples were ordered.

(d) Contractor will be notified of the test results only if there are deficiencies, therefore, compliance with the performance schedule must be maintained, regardless of this requirement for inspection samples.

(e) The next twenty (20) sets of each order as soon as completed, must be sent by airmail, or hand delivered to HQDA (DAAG-PAP), Rm GA 007, Forrestal Building, Washington D.C. 20314. These microfiche shall be deducted from the total quantity ordered.

2.19. SCHEDULE.-

(a) It is of the utmost importance that strict adherence to the production schedule be maintained. See also paragraph 1.10. "Special Notice of Caution to Bidders".

(b) Print orders and furnished material will be sent F.O.B. the contractor's plant certified air mail (return receipt requested) unless conditions warrant the use of certified regular mail service by the ordering agency.

(c) Complete shipment and mailing must be accomplished within 15 calendar days after receipt of print orders and furnished material.

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(d) Note: Contractor must not start production of any job until he receives the individual print order therefor.

(e) Print orders, master fiche, camera copy, and shipping instructions will be issued from the following address:

HQDA (DAAG-PAR)
Washington, D.C. 20314
Telephone: (202) 693-7590

(f) At contractor's option, the material will be made available for pickup at the contractor's expense, at the above address.

(g) Unscheduled material such as shipping instructions, delivery lists, labels, etc., will be furnished with each order or shortly thereafter. However, in the event the contractor does not receive such information in due time, he will not be relieved of any responsibility in meeting the shipping schedule because of his failure to request such information.

2.19-1. Designated Government Representative. - The contractor will work in conjunction with a designated representative of the Department of Army Publications Directorate in all matters relating to special details of schedule or production, etc., provided that any instruction received or arrangements made do not conflict with or tend to alter or amend the terms of this contract in any particular. Refer to paragraph 1.5. "Authorization for Additional Performance".

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SECTION 3.- BASIS OF AWARD

3.1. BASIS OF AWARD.-

(a) Award will be made to the responsible bidder whose total aggregate cost results in the lowest bid. The Government will determine the total aggregate cost by applying the prices quoted in Section 4. "Schedule of Prices", to the following units of production which are the estimated requirements to produce 1 year's orders under this contract. These units do not constitute, nor are they to be construed as, a guarantee of the work which may be ordered under this contract for a like period of time.

(b) All the needs of the Department requisitioned on this program from the Government Printing Office which are applicable to the product or products covered by these specifications will be ordered by the Government Printing Office under this contract.

(c) The item designations used herein correspond to those used in Section 4. "Schedule of Prices".

I. 1,531,000

II. 1,283,000

III. 2,675 at 32 lbs.

Duplicate Microfiche - Army Publications

SECTION 4.- SCHEDULE OF PRICES

4.1. SCHEDULE OF PRICES.-

(a) Prices quoted shall be F.O.B. destination address. Bidder must submit a quotation for each item listed. Failure to quote on all items or any other omission, obliteration, or alteration to these specifications, or the order and manner of submitting the prices herein may be reason for REJECTION OF BID.

(b) The Public Printer reserves the right to reject any bid that contains prices for individual items of production (whether or not such items are included in the Basis of Award), that are inconsistent or unrealistic in regard to other prices in the same bid or to Government Printing Office prices for the same operation if, in his opinion, such action would be in the best interest of the Government.

(c) All vouchers submitted to the Government Printing Office must be based on the most economical method of production at the prices quoted.

I. DUPLICATE COPY MICROFICHE: The prices quoted are all inclusive, and include all materials and services necessary to produce copies of each one of a set of furnished masters, in the indicated quantity, and must include all necessary intermediate steps, except collating into sets which is to be priced separately.

Duplicate copies of each master.....per copy.....\$_____

Collating into sets as requested...per 1,000 fiche...\$_____

II. PACKING: Prices quoted must include, as applicable the costs of all necessary printing and packing operations and materials and all external labeling and marking operations and materials in accordance with these specifications.

(a) Inserting sets into printed envelopes and sealing (including cost of printing and envelopes)
.....per 1,000 sets.....\$_____

Duplicate Microfiche - Army Publications

(b) Packing and sealing shipping containers (including cost of materials) weighing over 30 lbs. but less than 40 lbs.....per container.....\$_____

SCHEDULE OF PRICES

4.2. BIDDER'S FIRM NAME AND SIGNATURE.- Quote prices in strict accordance with the specifications. Fill out and return three sets of pages 17 and 18, initialing or signing each in the space provided.

Bidder _____

By _____
(Signature and title of person authorized to sign this bid)

(Name of person to be contacted for placement of orders)

(Telephone Number)

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EXHIBIT A

LABELING OR MARKING: All labeling or marking shall be in accordance with the requirements outlined herein. Non-compliance will be cause for the Government to relabel as required and charge all costs to the contractor. The Public Printer reserves the right to institute this action without prior notice to the contractor. The label shown is a suggested format. All applicable entries must be filled in, using bold face type.

Exterior packages must be marked by printing or pasting the label in an appropriate position on one end (never top, sides or bottom) of all containers. This is in addition to any required mailing label. All entries, except those in the "To" and "From" boxes, must be $\frac{1}{4}$ " high or larger. If the container will also have a mailing label, the "To" and "From" boxes on the container label need not be filled in.

(CONTAINER LABEL)

To: Note: All available information must be entered in the appropriate boxes. The "Stock No. - Control No." box, if not applicable, may be used for other required additional information or may be deleted.	DEPT. (as applicable) DEPT. REQUISITION NO. (as applicable) S.P.O. JACKET NO. (from Print Order)
STOCK NO. CONTROL NO.	QUANTITY (contents of this container) FORM OR PUBLICATION DATE
TITLE: DUPLICATE MICROFICHE - ARMY PUBLICATIONS (Contractor to add title of individual publication)	FORM OR PUBLICATION NO. S.P.O. ORDER NO.
FROM:	PRINT ORDER NO.

APPENDIX C

PAPER vs MICROFICHE PUBLICATIONS COSTS

Throughout the IMPACT II study the individual costs or items of expense associated with production and distribution of publications have been described. Additionally, some specific publications have been mentioned in terms of their total cost and the resultant savings or cost avoidance through the use of microform. Prior to changing a current process or method of operation it is necessary to determine estimated costs associated with the new approach. A comparison of the current system costs against the estimated costs of the new approach is used to determine cost effectiveness of one approach over the other. While there is a strong emphasis placed on that alternative which is most cost effective it is not the only factor to be considered in selecting the best system. New approaches may have greater costs attached to them but provide desirable benefits not achievable under the old approach. Micropublishing provides at least two significant benefits over the current system in addition to being a more cost effective approach to doing business.

The production (printing and distribution) time required for micropublishing is very short, thereby increasing the currency of the information. Publications containing information of significant impact on daily operations can be produced on a ninety day or shorter cycle where previously the fastest turn-around time in paper may have been six months. A second benefit is the elimination of the posting function carried out at every location within the Army due to the constant receipt of changes to existing publications. Costs associated with micropublishing make it practical to reissue the whole publication, not just the changed pages.

New approaches have a tendency to bring forth or thrust upon users undesirable benefits. Micropublishing has some undesirable characteristics, however they can be overcome or accepted by users in all cases, if they are addressed prior to or during production of the publication. One negative facet of microform is that it is small and requires a viewing device to read the information. While quality viewers are available for office use the portable viewer for field use is still in the making. Therefore publications used in the field cannot now be micropublished. Another negative point to microforms is that they cannot be annotated like paper can. But, viewer-printers can solve that part of the problem not solved as a result of redesign and production of the publication as a micropublication.

It is impossible to provide an accurate paper versus

microfiche cost picture for the total number of publications in the Army because of the uncertainty of their conversion to microfiche. Additionally, far too many assumptions and estimates would be required as part of the cost construction to make a meaningful or acceptable analysis. However, a comparative cost of paper versus microfiche can be constructed using a group of publications identified for initial entry into micropublishing. The publications indexes, DA PAM 310- are the first group of publications to be micropublished as a result of this study.

The DA PAM 310 series publications are constructed from an automated data base. Therefore, paper versus microfiche costs were constructed beginning with receipt of the publication tapes. Figure 1 shows cost of printing and distributing DA PAM 310-1, -2, -3, -4, -6, -7, and -99 in paper using most recent issue cost. The printing cost for one issue was taken from Government Printing Office bills presented to Department of Army Publications Directorate for payment and includes the 9% fee for handling the work. In two cases (DA PAMs 310-4 and -99) the printing cost was developed using an established Publications Directorate estimating formula because the most recent issue of the publications were in microfiche only. The formula is as follows:

\$30.00 per page for the first 1,000 copies and \$2.50 per page per 1,000 copies thereafter. These figures were raised from \$26.50 and \$2.15 respectively on 1 January 1979 to compensate for recent increases in the cost of paper.

The distribution cost shown is equivalent to the fourth class postage of each publication mailed as a separate item. This does not show the true cost of distributing a paper publication. However, the fourth class postage rate is a reasonable cost to attach considering the additional distribution costs described in para 2-5c of the study and the various distribution modes (1st class through motor freight) used to accomplish distribution.

Figure 2 shows cost of producing and distributing DA PAM 310-1, -2, -3, -4, -6, -7, and -99 in microfiche. Production of the micropublished product has several items of expense, these costs for each of the publications listed on Figure 2 will be found at Figures 3 through 9. The costs used were taken from existing contracts currently being used to produce DA PAMS 310-4 and -99 in microfiche. Production cost is given for first and subsequent issues of each publication because publications have a one-time design (layout) cost. Unless otherwise stated on the publication detail sheet the page count and number of copies was taken from the most recent paper issue. Currently, DA PAMs 310-4 and -99 are produced in microfiche. Distribution costs were

developed as follows: all microfiche publications are packed in individual envelopes and weigh less than one ounce, 3rd class bulk pre-sorted by zip code has a rate of 8.3 cents for one ounce, and delivery is one day more than first class. To the 8.3 cents per package we added 2.7 cents to cover handling and addressing, for a total of .11 cents per copy distributed.

The total cost of producing and distributing the publications described in Figure 1 (paper mode) is \$9,024,955, while the total cost of the same publications in microfiche (Figure 2) is \$1,085,290. This is a cost difference (savings/avoidance) of \$7,939,665 over five years. However, from this amount must be taken the projected cost of 58,000 microfiche viewers necessary to support introduction of administrative publications in microform Army-wide. The projected cost of the viewers is \$7,825,000; this leaves a remainder of \$114,665 cost savings/avoidance over five years of publishing the seven identified DA PAMs in microfiche using the current publishing schedule frequency. The current frequency of publication is not the desired frequency but rather, a frequency imposed by limitations of publishing paper (sheer bulk) that is beyond the control of the Publications Directorate. This situation directly affects the users currency of information in those cases where the index is produced once every six months (310-3 and 310-4). The desired distribution of all identified DA PAMs is quarterly, if all the identified PAMs could be created quarterly in paper the additional cost for five years over costs previously shown would be \$5,199,185. Micropublishing the publications indexes will permit the quarterly cycling of the indexes at a cost of \$541,390 over the current schedule micropublishing cost for five years. This is a difference (cost avoidance) of \$4,657,795. Additionally, it will raise the currency of information to the user by as much as 100%.

Micropublishing of the publications indexes was selected for several valid reasons, one of which was that their conversion to microfiche would offset the costs necessary to support the procurement of viewing equipment for administrative publications. Implementation of all other administrative publications in microform will have little, if any, viewer equipment burden to support. Therefore, much greater cost avoidance associated with their micropublishing will be realized.

PAPER MODE

PAM 310-	NUMBER		PRINT COST ONE ISSUE	DISTRIBUTION COST ONE ISSUE	CYCLE FREQ 5 YRS	COST PER ISSUE	5 YR COST
	PAGES	COPIES					
1	144	89,150	35,507	\$ 82,018	15	\$ 117,525	\$1,762,875
2	158	87,100	33,942	80,132	15	114,074	1,711,110
3	133	72,500	22,471	57,275	10	79,746	797,460
4	831	56,400	140,052	120,696	10	260,738	2,607,380
6	167	44,500	22,695	40,940	10	63,635	636,350
7	131	30,100	13,755	23,779	20	37,534	750,680
99	238	18,000	17,255	20,700	20	37,955	759,100
TOTAL							\$9,024,955

FIGURE 1

FICHE MODE

PAM 310	PAGE COUNT	NUMBER COPIES	FICHE COST FIRST ISSUE	FICHE COST SUBQ ISSUES	DISTR COST PER ISSUE	CYCLE FREQ 5 YEAR	5 YEAR COST
1	144	89,150	7,719	6,719	9,807	15	248,890
2	158	87,100	7,621	6,621	9,581	15	244,030
3	133	72,500	6,517	5,517	7,975	10	135,920
4	831	56,400	22,515	9,515	6,204	10	170,190
6	167	44,500	4,669	3,669	4,895	10	86,640
7	131	30,100	3,542	2,542	3,311	20	118,060
99	238	18,000	3,048	2,048	1,980	20	81,560
TOTAL							\$1,085,290

FIGURE 2

DA PAM 310-1

INITIAL ISSUE

Design	1,000
Microfiche Titles (1 at \$1.90)	2
Per Frame (page) Cost (144 at \$3.30)	475
Silver Duplicates (2 at .25)	1
Diazo Duplicates (89,150 at .05)	4,458
Envelopes (89,150 at .02)	1,783
TOTAL	7,719

SUBSEQUENT ISSUES

Same as above minus design cost

Initial Issue Total	7,719
Minus Design Cost	-1,000
Subsequent Issue Total	6,719

FIGURE 3

DA PAM 310-2

INITIAL ISSUE

Design	1,000
Microfiche Titles (1 at 1,90)	2
Per Frame (page) Cost (158 at 3.30)	521
Silver Duplicates (2 at .25)	1
Diazo Duplicates (87,100 at .05)	4,355
Envelopes (87,100 at .02)	1,742
TOTAL	7,621

SUBSEQUENT ISSUES

Same as above minus design cost

Initial Issue Total	7,621
Minus Design Cost	-1,000
Subsequent Issue Total	6,621

FIGURE 4

DA PAM 310-3

INITIAL ISSUE

Design	1,000
Microfiche Titles (1 at 1.90)	2
Per Frame (Page) Cost (133 at 3.30)	439
Silver Duplicates (2 at .25)	1
Diazo Duplicates (72,500 at .05)	3,625
Envelopes (72,500 at .02)	1,450
TOTAL	6,517

SUBSEQUENT ISSUES

Same as above minus design cost

Initial Issue Total	6,517
Minus Design Cost	-1,000
Subsequent Issue Total	5,517

FIGURE 5

DA PAM 310-4

INITIAL ISSUE

Design	13,000
Microfiche Titles (2 at 1.90)	4
Per Frame (page) Cost (831 at 3.30)	2,742
Silver Duplicates (4 at .25)	1
Diazo Duplicates (112,800 at .05)	5,640
Envelopes (56,400 at .02)	1,128
TOTAL	22,515

SUBSEQUENT ISSUES

Same as above minus design cost

Initial Issue Total	22,515
Minus Design Cost	-13,000
Subsequent Issue Total	9,515

Last produced in paper in September 1978. First Issue in microfiche produced in April 1979. Page count taken from microfiche issue to develop paper costs.

FIGURE 6

DA PAM 310-99

INITIAL ISSUE

Design	1,000
Microfiche Titles (1 at 1.90)	2
Per Frame (page) Cost (238 at 3.30)	785
Silver Duplicates (2 at .25)	1
Diazo Duplicates (18,000 at .05)	900
Envelopes (18,000 at .02)	360
TOTAL	3,048

SUBSEQUENT ISSUES

Same as above minus design cost

Initial Issue Total	3,048
Minus Design Cost	-1,000
Subsequent Issue Total	2,048

A new publication, never produced in paper. First issue was June 1979. Page count taken from microfiche issue to develop paper costs.

FIGURE 9

DISTRIBUTION LIST

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